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*Illustrated.

One thing that will at once occur to every operating officer who reads the study of operating conditions on the Virginian and the Carolina, Clinchfield & Ohio, published in this issue of the *Railway Age Gazette*, will be the difference between the generalized and complicated difficulties with which he has to contend, and the specialized and simplified conditions on these two coal roads. It might seem at first that there was no general lesson to be learned from so highly specialized an example of railroading as this, but this assumption is wrong. It is only a short-sighted or opportunist view of the science of railroading which will accept conditions as they occur from day to day without following a general policy of so modifying these conditions that in time they will fall into a scheme which has been clearly thought

out and worked for. The great advantage that the Virginian and the Clinchfield managements had was that they started without dead timber; but dead timber should by no means be accepted as an absolute bar to working toward a comprehensive development of a railroad property in which each addition and betterment will be a part of a general plan for the improvement of the property; and by plan of improvement is meant a plan which will make the transportation machine more economical of operation. To carry out such a plan on the great majority of the railroads of the United States will require not only vast sums of money but years of patience and of freedom from short-sighted exploitation by owners, or even more fatal short-sighted government regulation.

While those who oppose advances in railway rates are seeking to show that the railways are enjoying their full share of prosperity the monthly statistics of the American Railway Association regarding car surpluses and shortages, disclose that on April 15, 1914, the number of idle freight cars was the greatest since 1909. On April 1 last the number of surplus cars was 141,525, and the shortage was 2,013. Within two weeks, as the figures for April 15 show the shortage declined to 455 cars, while the surplus leaped up to 213,324. The net surplus on April 15, 1914, was 154,373 cars greater than on April 15, 1913. The net surpluses at the middle of April during the last six years have been as follows in 1909, 296,320; in 1910, 77,357; in 1911, 186,103; in 1912, 79,389; in 1913, 57,498, and in 1914, 212,869. While the car surplus is now the largest in years it is far from being as Senator Cummins asserted on the floor of the Senate the other day, the largest that ever existed. It was larger for several consecutive months in 1908, and again 1909 than it is now, having reached in 1908 a maximum exceeding 400,000 cars. The present unsatisfactory condition of the railway business is due not only to a falling off in traffic but to a greater extent to increases in operating expenses which the railway managements have been wholly unable to prevent.

The president of a large railway system writes the *Railway Age Gazette* as follows:

Bookkeeping on Alaska Government Railways

I have read your article on "Government Construction in Alaska" (*Railway Age Gazette*, March 27, page 726) with much interest. But there is a curious feature that you neglected to mention: When Congress had decided on the expenditure of thirty-five millions to begin with, with the Lord knows how much more to finish with, on the so-called "report" of a commission which put in only a few months' work, one of the features of the bill as passed in the Senate was that the accounts of the road were to be kept according to the rules of the Interstate Commerce Commission. The same provision was in the House bill, but in conference it was amended so that as it finally passed the commission is to have jurisdiction *only if the road is leased to a private corporation*. In other words, the government proposes to do its own bookkeeping—presumably intending to follow the archaic methods current in the postoffice and other departments, under which profits can be shown as earned by the simple process of having some other department take care of the expenses.

The action of Congress in eliminating the provision requiring the accounts of the government railways to be kept according to the rules of the Interstate Commerce Commission was characteristic action for a government to take. Uncle Sam requires railways owned and operated by private companies to keep their books according to methods prescribed by the commission itself and which are intended to show exactly what the railways are earning, from what sources the earnings are derived, what the roads are doing with the money, and that they are dealing fairly with the public. On the other hand, every individual or commission that ever has investigated the way in which the government keeps its own books has condemned its accounting system as confusing, misleading and vicious. Having decided to spend millions for railway construction in Alaska, without having done anything material to find out where railways should be built or what their cost and traffic are likely

to be, the government decides to keep the books of its railways in its own way instead of as railway companies are required to keep theirs. Why is this done? Is Congress afraid that if the books of the government railways are kept as prescribed by the commission the public may find out just how the government railways are built and run? Meantime, we recall that only a short time ago the management of a large railway was sharply called down by the Interstate Commerce Commission for not having kept its books as the commission deemed proper. "Consistency, thou art a jewel"—but there is not the smallest demand for you in government circles.

THE MAIN REASONS FOR ADVANCES IN RATES

IN spite of all that has been said and written on the subject, in spite of all the evidence that has been adduced, it is still hard or impossible for many fair and intelligent persons to believe that there is any real justification for advances in railway rates in the United States. They have been used to seeing rates go down; they have been used to hearing the railway business called one of "increasing returns"; and the suggestion that all past tendencies should be reversed comes as a shock. We believe, however, that any intelligent person who will consider the following points with an open mind will become convinced that under present conditions the downward trend of rates must now be arrested in the United States, as it already has been in almost every other country.

1. The prices of equipment and supplies steadily increased over a considerable period of years, and the wages of railway labor have continued to increase up to the present moment. *If other things remain equal*, while railway traffic increases, the cost of handling each unit of traffic will decline, and then rates may decline while profits increase. But if the costs of labor, equipment and supplies increase this tends to offset, and if the increases are sufficient will more than offset, the effect of the growth of traffic, the result being an increase instead of a decrease in the cost of handling each unit of traffic. To attempt to apply the law of increasing returns to the railway business under the conditions of recent years, is to stick to a theory when the facts on which that theory is predicated do not exist.

2. The public has for years been demanding an ever higher standard of freight and passenger service. Disregarding for the moment the effect of this on the amount of the investment in railways, it causes an increase in their operating expenses. As F. A. Delano showed in his recent testimony before the Interstate Commerce Commission, every raise in the standard of service increases the costs of maintenance of both way and equipment. You can't maintain big and expensive passenger stations as cheaply as small and inexpensive ones. You can't maintain track as cheaply when you operate fast trains as when you operate slow trains. And, of course, better service tends to increase transportation as well as maintenance expenses. Here we find another influence which tends to nullify the effect of the operation of the law of increasing returns.

3. Public regulation, while in many forms needful and justifiable, also tends to increase expenses in numerous ways. For example, the numerous reports that railways are required to make to commissions, legislative bodies and so on cost them a great deal of money. Another cause of expense is the time of their officers consumed in appearing before and negotiating with regulating bodies. Much regulation, such as that requiring larger train crews and semi-monthly payments of wages, causes heavy increases in expenses without conferring any appreciable benefit on anybody. The legislation regulating employees' hours of work, workmen's compensation and so on also involves added expense.

4. The higher standard of service demanded by the public requires much additional investment which is relatively unproductive. In other words, it does not, with present passenger and freight rates, cause a sufficient increase in net earnings to pay a return on itself. That is true of most of the hundreds of millions of the investment being made currently in passenger

stations and terminals, track elevation, safety appliances and steel cars. It does not follow that most of this investment ought not to be made. Most of it ought to be made in the interest of safety and good service. The point to which attention is directed here is that such investment is relatively or entirely unproductive in a purely economic sense, and that, therefore, it tends to increase the rates that must be charged. In recent discussions of the question of rate advances it repeatedly has been remarked that railway net earnings per mile of line are larger than in past years, the implication being that this shows the railways are prosperous. But suppose *investment* per mile has been increasing faster in proportion than *net earnings* per mile—then what? Now, this is just what has been occurring on the railways which have been responding the most enterprisingly to the public's demand for unproductive improvements in service. The trouble with the railways is not that their net earnings are declining—although four of the last six years have been bad years for them—but that net earnings have not been and are not increasing in proportion to investment and the demand for investment.

5. The rate of return which railways must pay on new securities in order to sell them at reasonable prices has been, and is, increasing. This is due to a number of causes. First, there has been an increase in the rate of interest throughout the world; and this necessarily increases the amount of return which railways, as well as other concerns, must pay. Second, as Mr. Delano made so clear in his recent testimony before the commission, the railways' own past borrowings and sales of stock have raised the average rate that they must pay. Many of them have out all of the bonds of various denominations that they can sell under present conditions except at ruinous discounts; and in many cases their surpluses in excess of moderate dividends are so small that they could not sell stock except at far below par; for the prices of outstanding senior securities are no criterion of what new securities could be sold for. Third, government regulation, by removing the speculative element from the railway business, has affected the return that must be reasonably assured in order to attract investment. In past years the investor in railway securities took the risk of losing his entire investment, just as did the investor in any other enterprise. But at the same time, like the investor in any other enterprise he could expect, if the business was successful, to receive substantial, large, or even enormous profits. Now, government regulation has about sounded the knell of stock bonuses, melon-cutting and so on, thereby causing railways to lose their interest for the more speculative classes of investors. At the same time, regulation has not augmented the attractiveness of railway securities for more conservative investors by increasing the certainty of a moderate return. In other words, its tendency has been to fix a maximum return, but no minimum return, a combination which makes all classes of large investors timid, and necessitates an increase in the average amount of profit earned and paid in order to attract them.

It will be seen that there have been concentrated on the railways numerous influences which have tended to increase the expense incurred by them in handling their business. In spite of the operation of these influences the tendency of rates up to the present has been downward. The influences that have tended to make necessary advances in rates have been counteracted by the operation of the law of increasing returns and by the economies that the managements of the railways have effected by the introduction of improved methods and machinery—economies without a parallel in any other country. But the railways can no longer go on as they have been going. They have reached the parting of the ways. The increases in operating expenses and in the return on investment necessitated by advances in prices and wages, by raises in the standards of service, by regulation, by the increase in investment and by increases in the rate of return that must be paid to capital have at last nullified the effect of the law of increasing returns and outstripped the economies introduced by the managements. The same situation has developed in numerous other countries, on

both government and private railways, and it has been dealt with by advancing passenger or freight rates. And that is the only rational way, from the standpoint of the public welfare, to deal with it in the United States.

WHY THE PRESENT FISCAL YEAR?

THE fiscal year of the great majority of the railways of the United States now begins on July 1 and ends on June 30. To many persons it doubtless seems that the limits of the fiscal year of a railway, like those of a government, are a purely arbitrary matter of accounting and of no practical importance from the standpoint of the efficiency and economy of physical operation. As a matter of fact, the limits of the railway fiscal year are, under present conditions, of very great importance from the operating and financial points of view.

In a discussion before the American Railway Engineering Association last month Edwin F. Wendt stated that after considerable investigation he had been unable to find any reason why the present fiscal year had been adopted and retained, except a vague statement that the railroads desired this. Regardless of the reasons why the fiscal year originally was made to end on June 30, it may be stated with considerable confidence that human ingenuity could not have chosen a worse date on which to have it end. It is probable that the selection of no other date out of the 365 in the year would have caused so much waste and loss in railway operations. Doubtless the original selection of the date was arbitrary and accidental. Probably it was chosen because it is the date upon which the fiscal years of most government end. However that may be, the limits of the railway fiscal year ought to be changed and made to correspond with the calendar year, because this would enable the railways, and especially the poorer railways, of the United States to save millions of dollars annually.

To those who have not studied the subject this will be a surprising and incomprehensible statement. To those who have studied it the statement will be recognized as one which can easily be supported by the most convincing facts and arguments. The main objection to a railway fiscal year ending on June 30 is, that it ends in the very midst of the period when maintenance work and expenditures should be at their height. In the effort to make a better financial showing the managements of weak roads year after year unduly curtail their expenditures during the concluding months of the fiscal year, and then unduly increase them immediately after the ending of the fiscal year. The executive, operating and maintenance officials know that in the long run this policy is unwise and expensive. Why, then, do they continue it? Because financiers in Wall street, who know little about the practical side of railway operation, compel them to do it, and because both the financiers and the executive and operating officers of many roads have been caught in a vicious circle from which they can escape only by changing the limits of the fiscal year to where they naturally belong.

All of these points will be made clear in subsequent discussions of the general subject in the *Railway Age Gazette*. The main purpose of the present editorial is to point out the reasons why the ending of the fiscal year on June 30 artificially increases the cost of maintenance of way and structures.

Operating expenses are classified by the Interstate Commerce Commission under five headings—Maintenance of Way and Structures, Maintenance of Equipment, Traffic, Transportation, and General. Probably the traffic and general expenses are influenced but slightly, if at all, by the time when the fiscal year ends. But the effect on expenditures for maintenance of way and structures and for maintenance of equipment is very important, and on transportation expenses is not negligible.

In the maintenance of way department a large proportion of the work is distinctly seasonal in character. In other words, it can be done much better and more economically in the spring and early summer than at any other time. The ending of the fiscal year in the very middle of this season demoralizes the work on many roads for the entire year. If an engineer should

be given a certain allowance and be instructed to spend it most economically, his first move would be to organize his forces and distribute his work over as long a season as possible. On many roads the ending of the fiscal year on June 30 prevents this. On many roads the engineer of maintenance of way is required to hold down his expenditures to the minimum until July 1, and is expected to do his whole season's work in the succeeding three or four months. This practice affects the cost of doing the work in many ways. The crowding of such a large amount of it into three or four months, when there is a very large demand for common labor in the harvest fields and elsewhere, frequently creates a shortage in the labor market and wages rise at least 10 per cent. The quality of the men available late in the summer is much poorer than that of those which can be secured in the spring, causing the efficiency of the forces employed to be reduced by at least another 10 per cent. Also because of the working of the maximum number of men during the hottest months of the year, there is a still further loss in efficiency.

It is common knowledge in almost all parts of the country that track is the weakest and requires the most attention at the time when the frost leaves the ground in the spring and the effect of the winter's traffic on it becomes evident. If sufficient forces be employed to enable the proper repairs to be made at this time, the work can be done at the minimum expense. With the small forces usually employed during April, May and June, low spots multiply, the track becomes rougher, and not only is the amount of labor required to bring it back into the proper condition in the summer greater, but the rail, fastenings and other track materials deteriorate more rapidly.

Once the work is started after July 1, the forces are soon demoralized by the demand for labor in the harvest fields. Also, traffic statistics show that the business begins increasing each year about July 15, and becomes heaviest about October 15; and it is during this period of increasing and heavy business that the greatest amount of track work is under way. On the other hand, the period of lightest traffic is in April and May, when the track forces of many roads are kept at a minimum.

As a result of these several conditions and others that might be mentioned it is evident that a given amount of work costs far more money than would be the case if maintenance could be carried on as seasonal conditions demand—a thing which the present limits of the fiscal year prevent. It may be safely asserted that every dollar saved in the spring under the present system costs two in the fall. The expenditures for maintenance of way and structures of all the roads in the country in the year ending June 30, 1911, as reported by the Interstate Commerce Commission (this being the last year for which complete figures are available) were \$336,025,262, or 18.87 per cent. of all expenses. Of this amount \$169,161,324, or 46 per cent., was paid to section foremen and other track employees, and \$49,892,732, or 13.6 per cent. to carpenters. Including all unclassified employees in this department, about \$225,000,000, or over 60 per cent. of all maintenance of way expenditures, are made for labor.

Assuming that one-half of this labor is employed throughout the year without reference to the fiscal year, it may be conservatively estimated that the efficiency of the rest is reduced at least 25 per cent. because of the reasons outlined above. In other words, the present limits of the fiscal year cause an unnecessary expense of at least \$28,000,000 annually in the maintenance of way department alone.

It is pertinent to inquire what the officers of the maintenance department are doing about this condition, which is the greatest obstacle to efficiency in their department. Some of them believe that it is useless to agitate the subject. With figures such as these to support their claims, they would be poor advocates, indeed, who could not plead their case before their higher officers with sufficient effect to cause them to give serious consideration to the matter. And, as we shall attempt to show later, it is by no means in the maintenance of way department alone that a saving could be made by changing the ending date of the fiscal year to December 31.

THE MICHIGAN CENTRAL AND THE BIG FOUR

THE two subsidiaries of the New York Central & Hudson River lying north and south, respectively, of the Lake Shore & Michigan Southern are the Michigan Central, operating 1,800 miles of road, and the Cleveland, Cincinnati, Chicago & St. Louis, operating 2,014 miles. Many conditions affecting operation even in normal years on these two New York Central lines are widely different, but in the calendar year 1913 these differences were actuated to an abnormal degree by the flood conditions which so seriously interfered with the operation of the Cleveland, Cincinnati, Chicago & St. Louis, and which, of course, did not affect the operation of the Michigan Central at all. It is just such unforeseen circumstances as the floods of last year which are so important a factor in the operation of a railroad, but which are so often overlooked in theoretical discussion of a fair return on investment. The effect of such circumstances is quite dramatically shown in the difference in results in 1913 and 1912 on these two New York Central subsidiaries on which presumably the general policy as dictated by the directors was the same for both properties for both years.

The Michigan Central earned net available for dividends \$1,283,000 in 1913, a decrease from 1912 of \$1,443,000, while the Big Four showed a net deficit in 1913, after the payment of interest charges, of \$2,698,000, as compared with a net income available for dividends of \$2,344,000 in 1912, or a difference as between the two years of \$5,042,000. A contrast such as this affords an unusually good opportunity to study and make some separation of particular circumstances affecting railroad income and general tendencies which, although the result, of course, of an aggregate of various circumstances, each one of which, if examined by itself, may appear to be a special circumstance, when taken as a whole reflect changed general conditions. The Big Four has outstanding \$34,100 stock per mile of road owned and of subsidiary companies operated; the Michigan Central, \$31,400. The Big Four has outstanding funded debt, including equipment trust certificates, of \$55,000 per mile, and the Michigan Central of \$106,000 per mile. Assuming that 1912 was a comparatively normal year for both roads, the Big Four earned gross per mile of road operated \$16,300, and the Michigan Central \$18,000. In 1913 the Big Four earned gross per mile \$16,800, and the Michigan Central \$20,000. The figures for funded debt per mile well illustrate how little necessary relationship there is between the earning power of a road and its capitalization. Not only has the Michigan Central \$106,000 bonds outstanding per mile of road owned as against the Big Four's \$55,000, but in addition it has rental charges amounting in 1913 to \$3,662,000, as against the Big Four's \$243,000. The Big Four operates, as was previously mentioned, 2,014 miles of road, of which 1,672 miles are owned or are lines of proprietary companies, and leases or has trackage rights over 341 miles. The Michigan Central, operating 1,800 miles of road, owns or operates lines of proprietary companies totaling but 596 miles, 1,110 miles being leased and 93 miles operated under trackage rights. Notwithstanding the capitalization figures which appear so favorable to the Big Four, even in 1912 that company, paying but \$500,000 in dividends (a dividend of 5 per cent. on the preferred) had a surplus of \$1,844,000, while in the same year the Michigan Central paid 6 per cent. on all of its stock and had a surplus of \$1,602,000.

Comparing for a moment the results of the two roads in 1912 for the purpose of getting a basis on which to judge of the abnormal conditions in 1913 on one of them, we find that the Big Four's operating ratio was 74.46 per cent. and the Michigan Central's 69.91 per cent. The following table shows the proportion of each of the general classes of expenses to total operating revenues in 1912 on the two roads:

	Big Four	Michigan Central
Maintenance of way and structures.....	11.97	11.03
Maintenance of equipment.....	17.95	14.32
Traffic expenses.....	2.32	2.63
Transportation expenses.....	39.84	40.45
General expenses.....	2.07	1.79

The main line of the Michigan Central runs from Buffalo to

Chicago, crossing at Detroit the company's north and south line running from Toledo, Ohio, to Mackinaw City, Mich., and in addition to these two lines, as will be seen from the map, there is a quite extensive mileage of branch lines. The main line of the Big Four runs from Cleveland to St. Louis, with a large mileage of lines which, although not strictly branch lines, are not comparable in earning power and profitableness of operation to the Cleveland-St. Louis line of the Big Four or the Buffalo-Chicago line of the Michigan Central.

The total tonnage of revenue freight carried on the Big Four in 1912 amounted to 25,817,000, and on the Michigan Central to 21,001,000; the freight density being 2,033,000 on the Big Four, and 1,794,000 on the Michigan Central. It will be seen, therefore, that the average length of haul was not greatly different on the two roads in 1912, the figure for the Big Four being 158, and for the Michigan Central 153. The total number of passengers carried in 1912 was 7,505,000 on the Big Four and 6,000,000 on the Michigan Central; the average passenger journey, however, being but 55 miles on the Big Four and 68 miles on the Michigan Central, so that the passenger density was 204,000 on the Big Four and 233,000 on the Michigan Central.

The striking contrast in the character of the traffic moved on the two roads is in the quantity of bituminous coal. The Big Four in 1912 carried 11,139,000 tons, and the Michigan Central 3,893,000 tons. This difference is partly offset by the fact that the Michigan Central carried 1,600,000 tons of anthracite coal and 2,105,000 tons of stone, sand and other like articles, whereas the Big Four carried but 237,000 tons of anthracite coal and 1,548,000 tons of stone, sand and other like articles. The tonnage of many other commodities is rather surprisingly alike on the two roads. Thus, on the Big Four grain furnished 1,593,000 tons, and on the Michigan Central 1,235,000 tons; lumber on the Big Four 1,908,000 tons, and on the Michigan Central 1,270,000 tons; although, of course, as would be expected, other articles—products of forests—furnished 1,231,000 tons on the Michigan Central, and but 199,000 tons on the Big Four. Other articles—manufactures—furnished 2,232,000 tons in 1912 on the Big Four and 2,672,000 tons on the Michigan Central.

The average ton mile rate on the Big Four in 1912 was 5.43 mills, and on the Michigan Central 6.64 mills; the average revenue per passenger per mile on the Big Four was 1.902 cents, and on the Michigan Central 2.025 cents.

In 1913 the Michigan Central showed what may fairly be called a normal healthy increase in business with the disproportionate increase in operating expenses which so many other roads are showing, while the Big Four, despite the flood conditions, showed some increase in revenues, but an increase in operating expenses that amounted almost to a temporary disaster. Freight earnings on the Michigan Central amounted to \$23,132,000 in 1913, an increase over the previous year of \$1,814,000, and passenger earnings amounted to \$9,306,000, an increase over the previous year of \$1,055,000, making the total operating revenues \$36,011,000 in 1913, or an increase of \$3,100,000, approximately 9 per cent.

The floods in 1913 caused a suspension of operation of the Big Four on a considerable part of the entire railroad for a full month, and of the 2,014 miles operated, 1,230 miles were affected to the extent of having bridges washed away or line cut. Freight revenue amounted to \$22,714,000 in 1913, an increase over 1912 of \$546,000, and passenger revenue amounted to \$8,172,000, an increase of \$394,000. Thus, total operating revenues amounted to \$33,480,000 in 1913, an increase of \$1,126,000, or slightly over 3 per cent. Here is a dead loss in total operating revenues, assuming that the normal rate of increase is 10 per cent., of over \$2,000,000, and to this must be added the very great increases in operating expenses directly traceable to the flood, and the other indeterminable but undoubtedly large amounts which are in the nature of "what might have been saved" had conditions been normal. President Smith estimates the total loss and damage to the company's property and business attributable to the flood at well above \$5,000,000. This appears to be a very conservative estimate.

Maintenance of way expenses on the Michigan Central increased in 1913 over 1912 \$1,220,000, and on the Big Four \$1,250,000; but it is pretty safe to say that the Big Four did not pay out in increased maintenance of way expenses for 1913 anything like the cost of the damage to roadbed. Work of this kind must be carried on slowly, and under the Interstate Commerce Commission ruling only so much of the cost of such work as is

makes transportation expenses abnormally high. The Michigan Central's ratio of transportation expenses to total operating revenues increased from 40.45 in 1912 to 41.69 in 1913, while the Big Four's transportation ratio increased from 39.83 to 43.40. The ratio of total expenses to operating ratio increased on the Michigan Central from 69.91 in 1912 to 75.85, and on the Big Four from 74.46 to 87.47. The following table shows the ratio



The Michigan Central and the Cleveland, Cincinnati, Chicago & St. Louis

represented by replacement is charged to expenses, and the additional cost of a new structure over and above what the old structure cost is charged to additions and betterments. The work that the Big Four is doing in the way of replacements is, of course, also in the nature of a betterment, so that in the long run the road will be in better shape than if the flood had not taken place; but this does not alleviate the showing of 1913, while the fact that such very extensive replacement work is being done

of each class of expenses for the two roads in 1913, and is in quite striking contrast to the comparison made for 1912 shown previously:

	Big Four	Michigan Central
Maintenance of way and structures.....	15.27	13.47
Maintenance of equipment.....	23.96	16.70
Traffic expenses	2.68	2.22
Transportation expenses	43.40	41.69
General expenses	2.16	1.77

The Michigan Central has a heavy train load for a road with as large a proportion of branch line mileage as it has, and in 1913 increased the average train load from 453 to 457 tons of revenue freight, and the total train load, including company freight, from 473 to 481. One reason that a greater increase in train load was not shown was because of an increase in the percentage of empty car mileage, due presumably to changes in traffic conditions beyond the control of the operating department. The average number of freight cars per train was 38.26 in 1912 and 38.99 in 1913, and of these 9.89 were empty cars in 1912 and 11.24 in 1913. There was a substantial gain in loading per car, the average number of tons per loaded car in 1913 of revenue freight being 17.03 as against 16.52 in 1912, and of all freight 17.92 as against 17.20.

The Big Four had an average revenue train load in 1912 of 474, and notwithstanding all of the adverse operating conditions met with during the year 1913 the train load was increased to 489 tons of revenue freight, an even greater gain being made in tonnage of all freight, which averaged 499 tons in 1912 and 515 tons in 1913. This gain was made almost entirely in increased length of train, the average number of tons of revenue freight per loaded car being 20.3 in 1912 and 20.6 in 1913, while the average number of freight cars per train was 33.6 in 1912 and 35.1 in 1913. The average number of empty cars per train was 9.2 in 1912 and 10.4 in 1913.

In commenting on the New York Central's report and that of the Lake Shore mention was made of substantial increases in the rates of pay of station employees. Apparently the same policy has been pursued on the Big Four and the Michigan Central, the increase on the Michigan Central amounting to over 10 per cent. and on the Big Four to over 9 per cent. Station employees are a class of employees who deserve and should be paid more than they are now, and the voluntary increase in rates of pay of these men when the temptation to save in every way possible was so strong as it was on the Big Four in 1913, shows a broader and humanitarian point of view.

The balance sheets of both roads, while showing ample working funds for present needs, also indicate that both companies will in the not very distant future have to fund some of their current liabilities. The Big Four had on hand at the end of the year \$3,646,000 cash, comparing with \$3,537,000 on hand at the beginning of the year. Loans and bills payable amounted to \$7,454,000 at the end of the year, as against \$2,745,000 at the beginning of the year. The Michigan Central had on hand at the end of the year \$2,620,000 cash, comparing with \$3,201,000 at the beginning of the year, and loans and bills payable of \$9,500,000, comparing with \$4,500,000 at the beginning of the year.

The Big Four spent a total of \$2,371,000 for additions and betterments to roadway and structures and \$7,793,000 for new equipment charged to capital account. The Michigan Central spent \$1,807,000 on its owned line and \$1,181,000 on its leased and proprietary lines, and in addition \$2,012,000 for new equipment less, however, \$1,030,000 for equipment replacement fund and accrued reserve for depreciation.

The following table shows the principal figures for operation for the two roads in 1913 and 1912:

	Big Four		Michigan Central	
	1913	1912	1913	1912
Average mileage operated	2,014	2,012	1,800	1,817
Freight revenue	\$22,713,959	\$22,168,002	\$23,131,936	\$21,318,205
Passenger revenue	8,171,752	7,778,136	9,305,636	8,250,336
Total operating revenue	33,840,298	32,714,238	36,011,886	32,911,753
Maint. of way and structures	5,165,499	3,915,421	4,848,852	3,629,732
Maint. of equipment	8,107,557	5,872,422	6,014,914	4,711,843
Traffic expenses	908,599	860,666	800,660	764,733
Transportation expenses	14,686,290	13,033,333	15,012,538	13,313,059
General expenses	731,417	677,902	636,309	589,388
Total operating expenses	29,599,362	24,359,745	27,313,273	23,008,756
Taxes	1,287,962	1,190,243	1,392,814	1,366,985
Operating income	2,942,328	7,135,769	7,290,381	8,564,111
Gross income	3,754,343	7,892,577	8,536,438	9,624,774
Net income	2,697,546*	2,344,352	1,283,161	2,726,333
Dividends		500,000	1,124,280	1,124,280
Surplus	2,697,546†	1,844,352	158,881	1,602,053

* Deficit. † Loss.

Letters to the Editor

BOX CARS ADAPTED FOR GRAIN SERVICE

DETROIT, Mich., March, 1914.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

Thirteen years ago a published effort was made to impress upon the railway companies the value of using dumping box cars for their grain service. It was pointed out that to unload grain from an ordinary box car takes twenty minutes for two men working steadily and aided by machinery, whereas with dumping box cars it would take only one man ten seconds to do the same work, and no machinery would be needed. Any railroad man could have gone to any elevator then, or can go to any elevator now, and verify this big labor loss in unloading grain cars, because even now the same practice prevails.

To the uninitiated it would seem that there would have been a cordial welcome by the railroads for anyone who pointed out such a loss and the means for stopping it, but, as the initiated individual who did the pointing out can testify, no such welcome was to be found, and only after persistent effort were the pleas for this economy even listened to. At last, however, President Chas. M. Hays did listen, and promptly admitted that dumping box cars for grain would add millions of dollars to the earnings of the Grand Trunk or any other grain carrying railroad, and had the *Titanic* found a safe harbor instead of an ocean grave, Mr. Hays would no doubt have been the man to start this needed reform.

Other high officials of the Grand Trunk admitted the value of a dumping box car, but believed it was impossible to build one with bottoms tight enough to safely carry grain, so as a matter of proof, an old and battered ore car of the Ingoldsby type was tested at Superior, Wis.; it was found that not even the dust from flaxseed could be lost out of it. Superintendent Clark of the Great Northern Elevator A conducted the tests, and at their conclusion said he was satisfied that with such cars, twice as many could be unloaded, and other officials who were present agreed with him and said the saving in time and labor would be enormous.

Since then, this subject has been taken up by Howard G. Kelley, vice-president in charge of operation, of the Grand Trunk, and he, after investigation, expressed the belief that one thousand dumping box cars would deliver as much grain as three thousand ordinary box cars. Such experienced railroad and elevator men as those herein named are not given to flights of fancy, and if their belief is justified at all, is it not strange that even now, after thirteen years of opportunity to get them, not one railroad in the world is equipped with dumping box cars for carrying grain?

To the mind of the writer, who has worked in season and out of season during all that long period for this improvement it does seem strange, but perhaps the *Railway Age Gazette*, or some of its readers can explain it without difficulty, and if so they may infuse life into the subject and thereby help the railroads to see one way of increasing their dividends and at the same time giving more efficient service to their patrons.

Is the answer, "banker management," or what?

F. S. INGOLDSBY.

THE COAL TRAFFIC OF FOUR LEADING ENGLISH RAILWAYS.—Returns recently issued by the English Board of Trade show that in 1913 the North Eastern carried 35,621,178 tons of coal; the Midland, 27,338,480 tons; the Great Western, 26,278,234 tons, and the London & North Western, 32,784,124 tons. The figures for the last three roads also include the quantities of coke transported, but the North Eastern which makes separate returns also reports 5,261,000 tons of that commodity.

Comparative Study in Operation—Virginian and C. C. & O.

**The Rogers Road Hauls All Its Coal Over 2 Per Cent.
Grade with 3 Mills ton Mile Rate and Earns Interest**

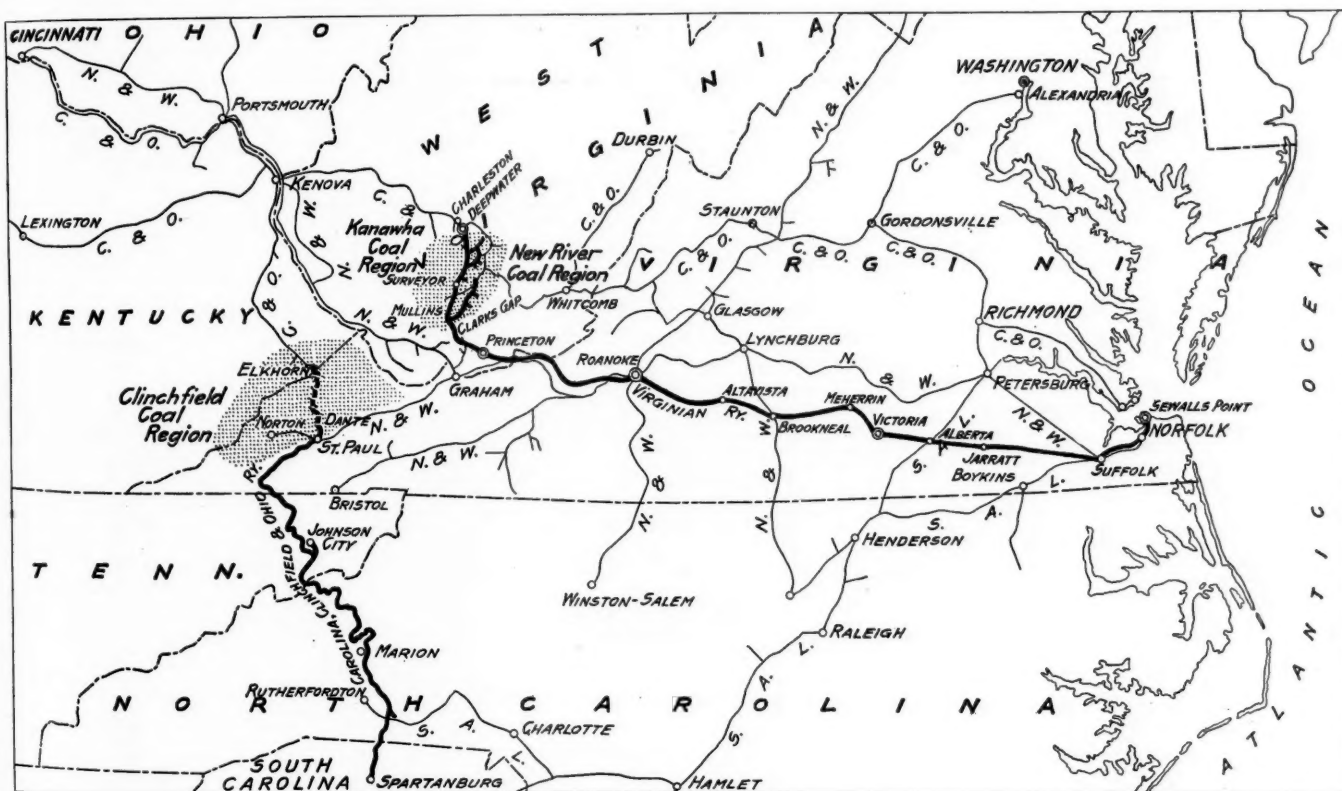
Both the Virginian and the Carolina, Clinchfield & Ohio were designed and built with the primary purpose of handling at a minimum cost heavy train loads of coal* eastbound from West Virginia and of handling the resulting movement of westbound empties as economically as possible. All of the coal traffic of the Virginian has to be hauled up over the Alleghenies and all of the Clinchfield's over the Blue Ridge. The natural obstacles presented to the builders were not less than, nor very different from those which builders of other railroads in the United States and in other parts of the world have had to overcome. Other conditions, however, permitted of a method of attack quite different from the usual American methods of railroad building.

The common practice in the building of American railroads has been to lay a line as cheaply and expeditiously as possible, which should create in good part the traffic which it was to carry, and with the growth of that traffic the line has been improved, re-

expensive and unscientific process of building piecemeal. The result was that both roads were designed and constructed scientifically, as machines to do a particular work at the lowest possible cost of operation. Even, however, in the case of these two roads there were certain unforeseen circumstances which arose and if the work were to be done over again, there would be probably some quite considerable changes in the design. This is less so with the Clinchfield than with the Virginian.

The Carolina, Clinchfield & Ohio runs from Dante, Va., almost due south through West Virginia and Tennessee to Spartanburg, S. C., 250 miles.*

The Clinchfield was not an entirely new road, a piece of the northern end and a piece in the middle, about 75 miles in all, having been in operation for a number of years; but the road as now operated was rebuilt when necessary so as to make the entire line conform to the standards set, and are equally a part, without



The Virginian and the Carolina, Clinchfield & Ohio

built piece by piece, and, if successful, has been kept abreast of the requirements made on it. The result has been an uneven development. Often one division has gotten improvements and additional facilities, not because its need was greater than that of some other division, but because one superintendent could present his argument for his needs in a more convincing way than could another. Furthermore, in an endeavor to spend an appropriation in such a way as to get the very best facilities at a particular point, this weak link in the chain has often been so strengthened as to be disproportionately better than any other link.

With both the Carolina, Clinchfield & Ohio and the Virginian the traffic to be moved—coal—was awaiting a railroad. In both cases the railroad builders had ample money to build a road all at one time without going through what is in the long run the

weak links, of a machine for the transportation of coal from the very extensive coal fields owned by the Clinchfield Corporation in southwestern Virginia and eastern Kentucky. The designers of the road also had in view the object of eventually making it a link in a new and improved route from the Middle West to the south Atlantic seaboard.

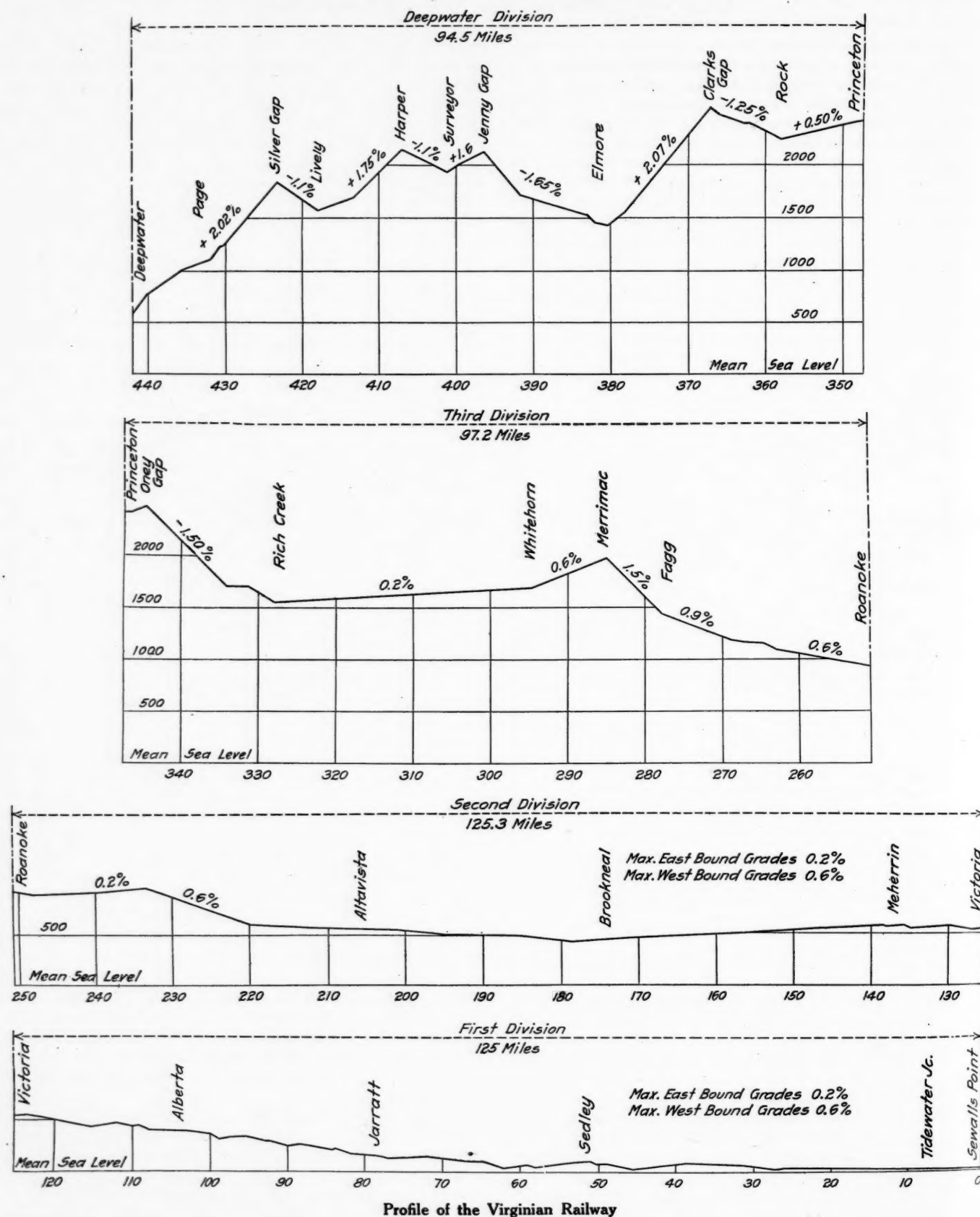
The syndicate which built the road was composed of wealthy men, including Thomas F. Ryan, Norman B. Ream and James Blair, who were interested in the Clinchfield Coal Corporation and in large tracts of land in Virginia and Kentucky. The road was planned by an operating man with an engineer's training—M. J. Caples. No expense was spared in the preliminary surveys and

*Both roads expect, and the Carolina, Clinchfield & Ohio is now getting, considerable other traffic, as mentioned later.

*There is an extension north from Dante to a connection with the Big Sandy branch of the Chesapeake & Ohio which will be ready for operation in a short time and which was described in the *Railway Age Gazette* of November 7, 1913, p. 861, but which for our present purpose need only be considered in a discussion of the future possibilities of the road.

a really remarkable amount of time, patience and study was put into the planning and designing of the road not only by Mr. Caples, but by the men who were to advance the money for the road. Throughout these preliminary plans the consistent object

routes would be classified as acceptable, good, and best; and after studying and thrashing over the whole set of problems involved, almost without exception the best route, which in nearly every case, of course, meant the more expensive route, was



Profile of the Virginian Railway

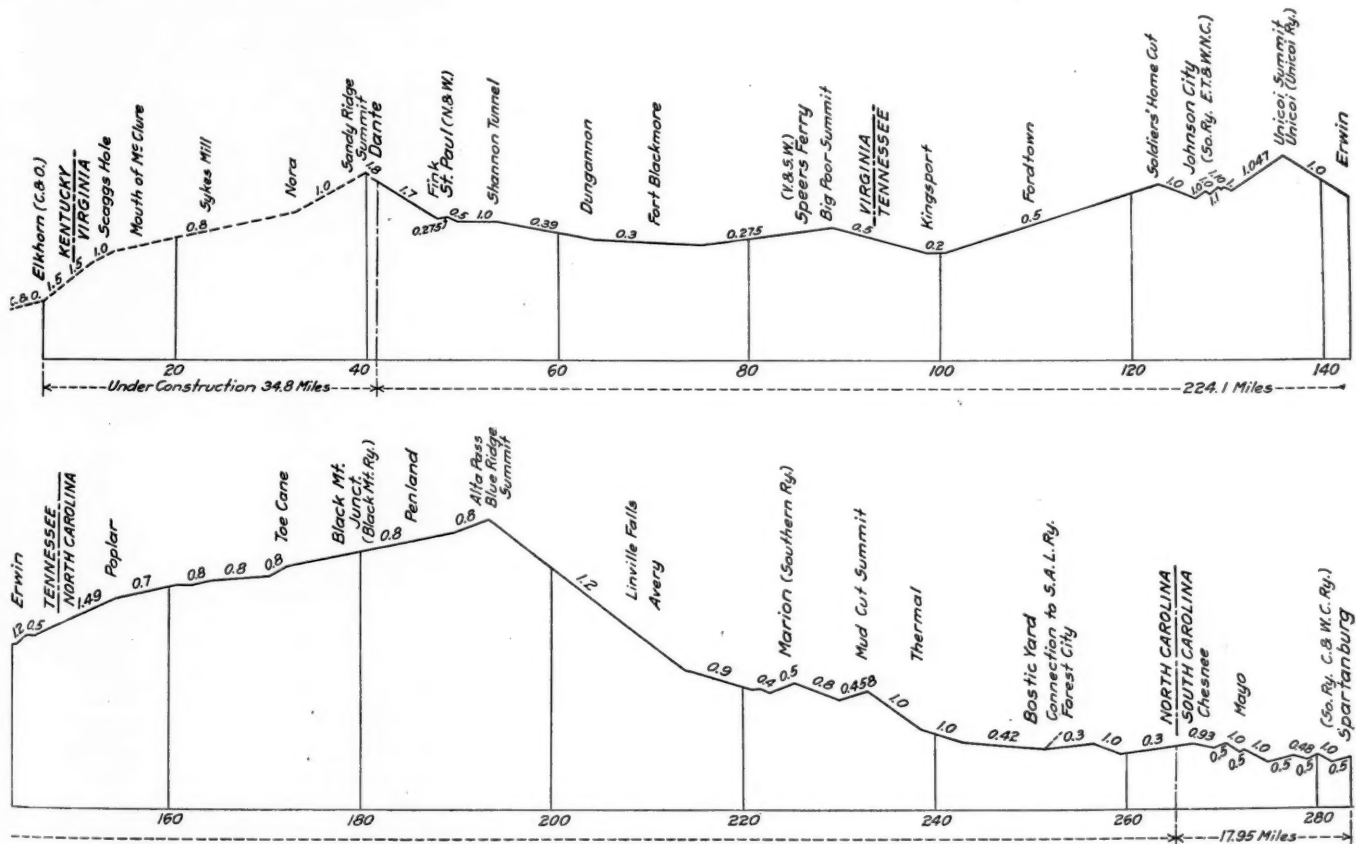
of making a homogeneous, evenly developed transportation machine which, although it should be built without extravagance, was to be built with very best standards was adhered to. Sometimes as many as six preliminary surveys would be made; the

selected. Assuming that the preferred stock and bonds outstanding represented the actual cash investment in the property, the 250 miles of line, with the present equipment, cost about \$120,000 a mile.

The Virginian, again assuming that the preferred stock and bonds outstanding represent cash investment, cost about \$117,000 per mile. The building of the Virginian was not quite as consistent a carrying out of a preconceived plan as was the case with the Clinchfield. The late H. H. Rogers became financially interested in large coal fields at Page, W. Va., and at other places in the West Virginia coal fields some years before the Virginian was thought of at all. He at first proposed to build a short stretch of line to connect his coal properties with the Chesapeake & Ohio, expecting to get a division of the through rate for his short road. The Chesapeake & Ohio would not come to his terms and he then started to build, and actually built, a much longer line to connect with the Norfolk & Western; but the Norfolk & Western, like the Chesapeake & Ohio, refused to come to his terms. He then conceived the idea of himself building an absolutely modern 450-mile low grade line to Norfolk, Va. No expense was to be spared; but, on the other hand, the road, unlike the Clinchfield, was designed by engineers rather than by

and, on the other hand, the building of wooden structures* on the western end of the road which have within the last two years had to be renewed to permit of the use of heavier engines. Furthermore, the imagination of the designers of the Virginian was not great enough to fully comprehend the possibilities of the eastern end in the way of train loads. The result has been that in the operation of the Virginian in the last two years there are certain problems which have been and are being worked out that are unique.

Both the Virginian and Clinchfield show to a remarkable degree the economies and effectiveness of operation which may be gained by a railroad having not only a plant and equipment designed especially for the work to be done, but *without obsolete plant or equipment which has to be used until worn out*. The ratio of transportation expenses to total operating revenues for the fiscal year ended June 30, 1913, for the Carolina, Clinchfield & Ohio was slightly over 17 per cent., and for the Virginian, 23.5 per cent.; the Clinchfield getting an average ton mile rate of 5.8 mills



Profile of the Carolina, Clinchfield & Ohio

operating men. As an engineering feat it is a very remarkable one and has been described very fully at different times in the past in the *Railway Age Gazette*.

Just what Mr. Rogers' plans for his road were it is impossible to say, but he undertook at first to finance the road entirely out of his own personal fortune with the idea, probably, of placing a mortgage on the property to an amount equal to a considerable part of its cost and of selling bonds secured by this mortgage to investors, leaving to himself the common stock and possibly the preferred. The panic of 1907 upset these plans. It was necessary to complete the road as quickly as possible, to issue notes secured by Mr. Rogers' guarantee and by some of his personal holdings of Standard Oil stock, and before the road was in complete operation Mr. Rogers died. These facts explain certain inconsistencies in the expenditures made on the road, such as, for instance, double track concrete bridges, on which as yet only a single track is laid on the eastern end of the road, where double track will not be necessary even with a development in traffic, which can hardly be hoped for, for a great many years to come;

on all its traffic—on coal alone, 4.6 miles; and the Virginian, 3.43 mills on all its traffic—3 mills on coal. If the Virginian had gotten as high a rate on its coal traffic as the Clinchfield its transportation ratio would have been in the neighborhood of 16.

The Carolina, Clinchfield & Ohio is divided into two operating divisions—one from Dante to Erwin, 101 miles, and the other from Erwin to Bostic yard, 108 miles. The Virginian is divided into four operating divisions—the Deepwater, from Deepwater to Princeton, 115 miles; the Third division, from Princeton to Roanoke, 97 miles; the Second, from Roanoke to Victoria, 124 miles; and the First, from Victoria to Sewall's Point, 125 miles. The freight density on the Clinchfield in 1913 was 1,591,000 tons; on the Virginian, 3,174,000 tons. The passenger density on the Clinchfield was 36,000, and on the Virginian, 27,500. Both the Clinchfield and the Virginian are single track, the Clinchfield having 4,000 ft. sidings every eight miles, and the Virginian 80

*The wooden structure on Harper hill was built before the Virginian as a tide water road was thought of, but the point is that such structures were not all rebuilt in accordance with the new standards before the road began operation.

car sidings (about 4,000 ft.) every six miles. The Clinchfield could probably handle about four times the freight traffic that it is now handling without additional side tracks or double tracking, and the Virginian nearly twice the freight traffic it is now handling. Of course, additional freight cars and locomotives would be required on both roads.

The Carolina, Clinchfield & Ohio began full operation from Dante to Spartanburg in July, 1910. At that time the company bought 11 Mallet and 15 consolidation locomotives. The consolidations weigh 178,650 lb. on drivers, have a total weight of 199,150 lb. and a tractive effort of 43,882 lb. The Mallets weigh 325,850 lb. on drivers, have a total weight of 378,650 lb. and a tractive effort of 77,400 lb. Since the Mallets have been in service the results obtained in practice have steadily improved, and although dynamometer car tests made at first did not show that the engines could haul the loads that have since been hauled in practice, the locomotives are now doing the work for which they were designed.

The distance from Dante to Spartanburg is 242 miles. The road is divided into two main districts, one from Dante to Erwin, 101 miles, and the other from Erwin to Bostic yard, 108 miles. There is one through freight (coal) train run southbound each day. It is handled with the following power: One Mallet from Dante to Kingsport, 58 miles; two Mallets from Kingsport to Johnson City, 27 miles; three Mallets from Johnson City to Erwin, 16 miles; two consolidations and two Mallets from Erwin to Poplar, 13 miles; two consolidations and one Mallet from Poplar to Alta Pass, 38 miles, and one Mallet and one consolidation from Alta Pass to Bostic yard, 59 miles. From Bostic to Spartanburg trains are handled by one Mallet making a round trip each day, but since trains are broken up at Bostic yard, and since about one-quarter of the coal traffic is delivered to connections at Bostic yard and at Marion, north of Bostic yard, it is the operation of trains between Dante and Bostic that we are principally concerned with. Going north the daily through freight train consists principally of empties and is handled with the following power: One Mallet and one consolidation from Bostic to Erwin; two Mallets from Erwin to the top of the hill at Uncoi and one Mallet from there north to Dante.

In addition to the through freight there are three local freights, one running between Johnson City and Dante, one between Johnson City and Alta Pass, and one between Bostic and Alta Pass, each local running north one day and returning the next. These trains are run as extras and are handled with consolidation locomotives. The passenger service consists of two passenger trains daily north and one passenger train and one mixed train daily south. Thus the total number of freight train cars brought south loaded in the through coal train and in the mixed train just about balances the total number of empties that can be moved north in the through northbound freight train.

In 1910, when the Mallets were first put in service the gross weight of freight trains southbound, including weight of equipment behind the drawbar, was about 5,400 tons. Since that time it has steadily increased until in 1913 it was about 6,480 tons. The time between terminals for 1910 varied from 14 to 15 hours on the Clinchfield division (the northern division) and from 13 to 14 hours on the Carolina division. The time in January, 1913, averaged 12 hours and 33 minutes on the Clinchfield division and 11 hours and 30 minutes on the Carolina division.

It is probably correct to say that a large share of the credit for the very remarkable showing made in transportation costs in the face of an increase in fuel cost per ton, and the increase in wages is due to the progress that has been made in handling heavy trainloads over rather heavy grades with Mallet locomotives. The consistent and constant effort of the operating management has been directed toward the entire elimination of small train units in freight service.

The Carolina, Clinchfield & Ohio had this distinct advantage in introducing heavy power. It was a new road; it was built with the idea of utilizing the heavy power; enginemen and trainmen who applied for jobs on the Clinchfield knew beforehand what they were getting into, and there was no dead wood

to be taken care of and there were no traditions of former managements which had to be overcome. What prejudice there was on the part of the enginemen and firemen to the Mallet locomotive had been almost entirely overcome. Enginemen today who have a choice of runs on Mallets or on the consolidations, prefer Mallets, in part, of course, because their pay is a little higher; but at any rate this preference shows that a small difference in pay is enough to lead an engineman to choose a Mallet in preference to a lighter locomotive.

It has been the experience of the Clinchfield operating officers that under conditions such as are found on that road the successful handling of very heavy train units depends largely on, first, the education of the enginemen in the use of the Mallet and, secondly, on adaptation of the machine to its particular work. The Clinchfield was peculiarly fortunate in being able to obtain the class of enginemen that were capable of this education. The education was effected by degrees. No attempt was made to force men into taking out heavier trains than they thought they could handle. Men were induced, rather than forced, to gradually increase the number of cars in trains. Cooperation between the more capable enginemen, the road foreman of engines and yardmaster was obtained, and naturally the less enterprising engineer fell into line as time went on. It was a process that took patience and some tact, but the results have amply justified the effort. Furthermore the Clinchfield has had no difficulty in keeping enginemen and firemen, and the men are getting some of the profits of the success of the experiment in the form of high and very steady wages. The experience of the Clinchfield has been that one fireman can without any difficulty fire a Mallet on a 100 mile run with a 6,400 ton train. On this run he shovels about 12 tons of coal, or something less than a ton of coal an hour.

The engines themselves are considered to be in better shape now than they were when first bought three years ago. They, like the enginemen, have been adapted to their work. At first considerable difficulty was experienced, but this has been overcome through minor changes. To mention but one of these changes as an illustration—when the engines were delivered they had 5½ in. nozzles; these have now been changed to 6½ and 7 in. nozzles, and a material gain has been made in efficiency. While not many of these engines have been put through the shops for full general repairs the expense of light general repairs has not been found to be heavy and the cost of the work on one engine that was rather badly damaged in a wreck was not at all excessive. All of the repair work is done at a small but quite complete shop at Erwin, where new modern machine tools are being installed as fast as there is need for them.

The Clinchfield has certain distinct advantages, but on the other hand it has many of the difficulties that the other coal roads have to contend with. Its grades are not so low as those of the Chesapeake & Ohio. The grades, however, on the Clinchfield are located so that a theoretical grade reduction is made by pusher service at a low cost. It has a number of 14 deg. curves and its coal cars have to be hauled northbound empty almost without exception. On the other hand, it has no old and obsolete power in operation. Its fuel supply is excellent. Its standards are absolutely modern, and it has had the advantage of the experience gained in building other roads. Its water supply is exceptionally good and fully 50 per cent. of its water tanks are gravity tanks. The water is of very good quality and needs no treatment. The company has an unusually large supply of modern steel coal cars, which have been in service only a few years and have, of course, been very inexpensive to maintain as yet. They are divided as between 50-ton hopper cars and 50-ton gondolas, the larger number being hopper cars. Nearly all of the coal is handled in the company's own cars and the road gets an average haul on its coal of nearly the entire length of its line, about 213 miles. The road's relations with both the Southern Railway and the Seaboard Air Line, as well as with the Norfolk & Western, are particularly friendly, which is of material advantage in the interchange of freight and of keeping a full supply of cars on hand during times of heavy loading

and getting a full utilization of surplus cars by lending them to other roads in times of smaller loading.

The Virginian was in operation some time previous to 1910, but the first annual report issued was for the year ended June 30, 1910, and the great gains which have been made in the successful operation of the road have been made within the last two years. With a coal road dumping at tidewater the output of the mines is governed first, by the market for bituminous coal; secondly, by the facilities which the roads serving the mines have for handling the coal, and thirdly, by the despatch with which coal cars can be unloaded into vessels at tidewater and returned to the mines. Since the Virginian was an outsider road building into the territory of two other roads—the Norfolk & Western and the Chesapeake & Ohio—a number of its mines are also served by another road; but the Norfolk & Western's relations with its mines being such that it was secure from attack, the Virginian had to content itself with new mines which were opened on its lines, and with competing for business with the Chesapeake & Ohio. The rate, of course, on bituminous coal is the same for all three roads from West Virginia fields to tidewater, namely, \$1.20 a ton for New River and Pocahontas coal, and \$1.40 a ton for Kanawha coal.

As will be seen from the accompanying profile, the Virginian has one mountain division on which the grades are heavy, and on which there are many 12 deg. curves and very numerous tunnels. All of the coal comes from west of Clarks Gap, but after the coal is brought to the summit of Clarks Gap it is a comparatively easy matter to handle it over the Third division in very large train units, and the maximum grade against eastbound traffic on the Second and First divisions is 0.2 per cent.

TABLE I—ENGINES AND RATING ON THE VIRGINIAN
Deepwater Division—Page, W. Va., and Princeton, W. Va.

				Tonnage rate—Eastbound on 2.07 max. grade		
Engine	Class	Service	Tractive power	Page to Elmore	Elmore to Clarks Gap	Clarks Gap to Princeton
A.A.	Mallet	Road	70,800	985	927	3,830
A.C.	Mallet	Road	90,000	1,284	1,183	4,888
A.D.	Mallet	*Pusher	115,000	...	1,512	6,250
M.B.	Mikado	Mine Run	56,000	780	736	3,040
<i>Third Division—Princeton, W. Va., and Roanoke, Va.</i>						
M.C.	Mikado	Road	60,800	6,000 tons—80 loads—(limited to this by braking conditions)		
M.B.	Mikado	Road	56,000	6,000 tons—80 loads—(limited to this by braking conditions)		
M.B.	Mikado	Pusher (Whitethorne to Merrimac, assisting trains with 6,000 tons)				
<i>Second Division—Roanoke, Va., and Victoria, Va.</i>						
M.C.	Mikado	Road	60,800	7,500 tons—100 loads		
M.B.	Mikado	Road	56,000	6,000 tons—80 loads		
<i>First Division—Victoria, Va., and Sewall's Point, Va.</i>						
M.C.	Mikado	Road	60,800	7,500 tons—100 loads		
M.B.	Mikado	Road	56,000	7,500 tons—100 loads		

*Clarks Gap to Elmore.

TABLE II—TRAFFIC ON THE VIRGINIAN

	Year ending June 30, 1913	Year ending June 30, 1912	Year ending June 30, 1911
Tons of coal carried.....	3,777,509	3,104,869	2,144,382
Total revenue tons carried.....	4,410,622	3,641,011	2,713,135
Tons revenue freight carried one mile	1,559,020.877	1,265,707.583	916,104.287
Revenue per ton per mile (mills).....	3.43	3.51	3.61
Revenue per ton per mile for coal (mills)	3.00	3.00	3.00
Average distance carried per ton (miles)	353	348	338
Average distance carried per ton coal (miles)	400	400	400
Number passengers carried.....	511,869	399,762	383,629
Passenger mileage	2,278,535	2,242,080	2,229,227
Revenue per passenger per mile (cents)	2.52	2.17	2.15

To get a bird's-eye picture of the operation of the road at present as a whole, we may follow briefly the progress of a normal day business as it moves over the road. Three or four train loads (2,064 tons), with one A C (Mallet) and two M B (Mikado) engines each, are brought from Page to Jenny Gap. Other smaller train loads are brought in by mine run engines and are assembled at Elmore yard. Five trains of about 58 loads each are hauled up over Clarks Gap by an A C on the head end with two A D engines pushing and are taken from Clarks Gap to

Princeton by the A C, the pushers returning light to Elmore. At Princeton trains are made up of 80 loaded cars and are hauled by one M C engine each to Roanoke, about four trains a day being run; from Roanoke to Victoria each of the four trains is hauled by an M C engine, and from Victoria to Sewall's Point yard by an M B engine.

About 85 per cent. of all the coal hauled is dumped at tide-water over the Virginian pier. About 20 cars of coal are delivered a day to the Seaboard Air Line at Alberta, about 15 cars at Jarratt to the Seaboard Air Line, and about 10 cars at Altavista to the Southern Railway.

As has already been mentioned, the management of the road did not at first realize the full extent to which they could use heavy power on the mountain division or the economical length of train loads with heavy power on the First and Second divisions. On the other hand, the Virginian was a pioneer in taking advantage of the possibilities which were afforded by the design and power of Mallet locomotives, and the problems which have been met and overcome are both interesting and instructive. Since the operation of the Deepwater division is far and away the most expensive part of the operation of the road, and since the greatest progress has been made in economies of operation within the last two years on this division, it is well to get a general view of the operation of the remainder of the road before describing what has been done on the Deepwater division.

The coal brought from the Deepwater division is assembled in a yard at Princeton. Previous to December, 1912, the Virginian had in service on the First, Second and Third divisions Mikado locomotives with a tractive effort of 54,954 lbs. These are rated on the road as M B engines, and with them 70 loads were handled over the Third division with the help of a pusher from Whitethorne to Merrimac, nine miles, the pusher going on to Flag and helping to push back up the 1.5 per cent. grade a train load of 70 empties. In December, 1912, 18 Mikados, with a tractive effort of 60,750 lb. (M C engines) were bought and eight were assigned to the Third division. These engines, with the help of an M B pusher, as noted above, handled 80 loads (about 6,000 tons behind the drawbar) over the 97 miles, thus making a gain almost without any additional expense except the interest charges on the new locomotives of 15 per cent.; wages, fuel costs and repair costs being no higher on the M C engines than on the M B.

The Second division, Roanoke to Victoria, is 124 miles, and with the old M B engines 80 loads (6,000 tons) could be handled eastbound over the division. With the new M C engines, of which eight were assigned to the Second division, 100 loads (7,500 tons) can be handled eastbound; and on this division, as also on the First division, the limiting factor at present is the length of siding, the sidings having a capacity of 80 cars only. When loads are pressing for movement, therefore, 100-car trains are run east, with 80 car trains of empties west, the empties taking the sidings. When empties are pressing for movement 100-car empty trains are moved west, with 80-car loaded trains east, the loaded trains taking the sidings. These sidings both on the Second and First division are now being lengthened to accommodate 100-car trains, and it will be possible in times of heavy traffic to handle 120 loads east with 100 empties west, or 120 empties west and 100 loads east. The average time on the Second division is about nine hours and 45 minutes eastbound, and the coal consumed as fuel about 15 tons.

On the First division, 125 miles, the grade is, as on the Second, 0.2 per cent. maximum against eastbound traffic and 0.6 per cent. maximum against westbound traffic. On this division an M B engine can handle 100 loads, and the time over the division eastbound is about nine hours and 40 minutes; the actual running time being in the neighborhood of eight hours and the amount of coal consumed as fuel about 14 tons. The progress that has been made in the operation of these three divisions in the last two years may be summarized as follows: On the Third division, by the substitution of M C for M B engines a gain of 15 per cent. was made; on the Second division, by the substitution of M C for M B engines a gain of 25 per cent.;

and on the First division, with the use of the same power and in no worse time, but simply through a realization of what could be done, a gain of 25 per cent. has been made.

Contrary to general opinion, the Virginian has to haul all of its coal up over a heavier grade than either the Norfolk & Western or the Chesapeake & Ohio, and, curiously enough, it was not realized at first that it was on the Deepwater division more than on any other that the very highest standards of modern engineering, both mechanical and civil, were necessary if the road were to earn a return on its investment with a ton mile rate of about three mills. The profile of this division shows strikingly some of the difficulties that have to be overcome. The nature of the country was such that 12 deg. curves and a great number of tunnels were a practical necessity. The Virginian gets all of its coal west of Elmore. The coal, therefore, all has to be hauled up over the Clarks Gap grade. Previous to December, 1912, two M B engines had been used to haul a 1,560-ton train from Page to Jenny Gap, and one M B and 2 A C (Mallet with 90,000 lbs. tractive effort) were used to haul a 2,775-ton train up to the summit of Clarks Gap. When the A D engines (Mallets with 115,000 lbs. tractive effort) were bought in 1912 the make-up of the train was changed; an A C was put on the head of the train and 2 A D's were used as pushers, so that the train load is now 4,332 tons. This is a gain in train loading of 1,557 tons, with no greater fuel cost, and a comparatively slight increase in wage cost, better time and generally more satisfactory service.

The A C engines have no trailing truck, and while it was necessary to make extensive changes to these engines, they are now fairly satisfactory road engines but cannot be satisfactorily used as pushers because on the 12 deg. curves they cannot be backed satisfactorily. On the other hand, the A D engines, which were bought from the American Locomotive Company and are equipped with superheaters, Street mechanical stokers and have trailing trucks, have given remarkably good results almost from the day of installation. By releasing the A C engines it was possible to use these, as already noted, in road service from Page to Jenny Gap, and these engines will, of course, be used in road service until worn out. One improvement which has been made to engines in service on Clarks Gap hill is the equipping of these engines with 12,000-gal. tanks, which makes a material saving, since it permits the A D engines to push a train from Elmore to Clarks Gap and return without taking water.

Between Page and Jenny Gap is Harper's Hill, on which, until 1912, there was a wooden viaduct or trestle which did not permit the use of A C engines. This has been eliminated with quite extensive revision of line to avoid curves, which is one of the factors of the economies which have been made on the Deepwater division.

The accompanying tables show the results which have been obtained, and from which tables it will be seen that, comparing 1913 with 1912, the total number of trains has decreased 18.8 per cent., the tonnage handled has increased 22.1 per cent. and the average tons per train have increased 50.3 per cent. On the basis of average tons per train for 1912, it would have required 2,947 trains to move the tonnage handled during the year 1913 with 1,960 trains.

The third factor in amount of coal shipped over the Virginian is the despatch with which this coal can be dumped into vessels at tidewater. There is no demurrage charge on cars held under loading for dumping at tidewater. The arrangement is that each mine operation (this is the name given to a mine or group of mines operating as a unit) is given a certain rating of cars. As long as the operator dumps enough cars at tidewater to keep the total number of cars he is using below the total number of cars which he is entitled to use, including those held at Sewall's Point, he is supplied with his daily quota of empties. When, however, he has so many cars held at Sewall's Point that his total allowance is reached, an embargo is placed on the operation until sufficient cars of its coal have been dumped at the pier and empties returned, when the embargo is lifted. Cars

loaded for points off the Virginian Railway are considered as part of the mine's allotment, and these cars are not counted released until they are returned to the Virginian. This method

TABLE III—RATING OF ENGINES AND COMBINATIONS OF ENGINES ON CLARKS GAP HILL

Engine	Tractive effort	Per cent. of power	Maximum rating, Clarks Gap	Rating 10 per cent. off	Number of 76 ton cars	15 per cent. off	Number of cars	20 per cent. off	Number of cars
M B....	55,954	100	920	828	10.9	782	10.3	736	9.7
M C....	60,743	107	984	...	...	...	...	788	...
M A....	45,170	80	736	662	8.7	625	8.2	588	7.7
A A....	70,800	126	1,159	1,043	13.7	985	13.	927	12.2
A C....	92,000	164	1,510	1,359	18.	1,284	17.	1,208	15.9
A B....	100,800	180	1,656	1,490	19.6	1,408	18.5	1,324	17.4
A D....	115,000	205½	1,886	...	...	...	...	1,512	...
C A....	29,376	52	478	430	5.6	406	5.3	382	5.
E A....	23,470	41	377	340	4.4	320	4.2	301	3.9
T A....	30,900	55	506	455	6.	430	5.6	405	5.2
S A....	45,170	80	736	662	8.7	625	8.2	588	7.7
M B....	...	...	...	...	...	...	...	...	...
A C....	...	...	3,940	3,546	46.6	3,349	44.	3,152	41.4
A C....	...	...	...	...	...	...	...	...	...
M B....	...	...	...	...	...	...	...	...	...
A B....	...	...	4,086	3,678	48.4	3,473	45.7	3,268	43.
A C....	...	...	...	...	...	...	...	...	...
A A....	...	...	4,179	3,761	49.5	3,552	46.7	3,343	44.
A C....	...	...	...	...	...	...	...	...	...
A A....	...	...	4,325	3,893	51.	3,676	48.3	3,460	45.5
A B....	...	...	...	...	...	...	...	...	...
A C....	...	...	4,530	4,077	53.6	3,850	50.6	3,644	47.7
A C....	...	...	...	...	...	...	...	...	...
A B....	...	...	4,676	4,209	55.3	3,975	52.3	3,740	49.
A C....	...	...	...	...	...	...	...	...	...
A A....	...	...	...	...	...	...	...	4,232	55.7
A D....	...	...	...	...	...	...	...	...	...

ENGINE RATING: TONS BEHIND TENDER, EXCLUSIVE OF CABOOSE, ON CLARKS GAP HILL—2.07 PER CENT. GRADE

			Tractive force	Maximum rate	20 per cent. off working rate
M A	Baldwin Mikado	...	45,170	736	588
M B	Baldwin Mikado	...	55,954	920	736
M C	Baldwin Mikado	...	60,743	984	788
A A	American Mallet	...	70,800	1,159	927
A C	Baldwin Mallet	...	92,000	1,510	1,208
A B	Baldwin Mallet	...	100,800	1,636	1,324
A D	American Mallet	...	115,000	1,886	1,512

TABLE IV—COMPARATIVE TONNAGE EASTBOUND OVER CLARKS GAP HILL

Months	1913				1912				Percentage of increase			
	Loads	Tons	Trains	Avg. tons	Loads	Tons	Trains	Avg. tons	Loads	Tons	Trains	Avg. tons
Jan....	8,701	626,504	193	3,245	6,129	435,154	171	2,545	41.9	43.9	12.8	27.5
Feb....	7,906	573,659	179	3,205	5,960	424,939	188	2,260	32.6	35.0	4.8	41.8
Mar....	8,268	598,078	180	3,322	8,207	609,642	267	2,283	7	1.9	32.5	45.5
April...	6,969	503,983	151	3,337	5,396	378,186	207	1,827	29.1	35.2	27.0	82.6
May....	6,671	478,062	144	3,320	6,807	486,067	277	1,755	2.0	1.6	48.0	89.1
June....	6,279	434,877	136	3,197	5,346	378,735	236	1,605	17.5	14.8	42.3	99.1
July....	6,340	460,631	139	3,314	5,149	366,142	214	1,711	23.1	25.8	35.3	97.3
August...	7,819	569,425	161	3,537	6,948	500,738	226	2,215	12.5	13.7	28.7	59.7
Sept....	7,808	564,635	156	3,632	5,957	429,726	161	2,669	31.1	31.4	3.1	36.1
Oct....	9,121	662,560	186	3,561	6,466	511,291	163	3,137	41.1	29.5	14.1	13.5
Nov....	8,976	645,905	180	3,588	6,480	464,105	150	3,094	38.5	39.1	20.0	10.5
Dec....	7,462	541,141	155	3,485	6,740	485,427	154	3,152	10.7	11.4	.65	10.5

Figures in *italics* denote decreases.

TABLE V—EASTBOUND TRAINS OVER CLARKS GAP HILL

Months	Number trains		Number of trains it would have required to move tonnage of 1913 on basis of average tons per train for 1912
	1913	1912	
January	193	171	246
February	179	188	254
March	180	267	262
April	151	207	276
May	144	277	272
June	136	236	271
July	139	214	269
August	161	226	257
September	156	161	212
October	186	163	211
November	180	150	209
December	155	154	171

has worked out with satisfaction both to the railroad company and the operators. Its success is due to the fact that it recognizes and utilizes the fundamental fact that the railroad company and

the mine operators' interests are identical. It is of great importance to the operator that he be permitted to ship coal in times of slack trade so as to keep his mine in continuous operation. This he could not afford to do if a heavy or even moderate demurrage or per diem charge was made for cars under

TABLE VI—SUMMARY OF TONNAGE OVER CLARKS GAP HILL FOR 1913 AND 1912

Month	1913				1912			
	Trains	Loads	Tonnage	Loads at mines	Trains	Loads	Tons	Loads at mines
January...	193	8,701	626,504	8,630	171	6,129	435,154	6,045
February...	179	7,906	573,659	7,731	188	5,744	409,380	5,589
March.....	180	8,268	598,078	7,176	267	8,207	609,642	5,851
April.....	151	6,969	503,983	6,492	207	5,396	378,186	5,274
May.....	144	6,671	478,062	6,013	277	6,807	486,067	5,907
June.....	136	6,279	434,877	5,809	236	5,346	378,735	4,840
July.....	139	6,340	460,631	6,054	214	5,149	366,142	4,504
August....	161	7,819	569,423	7,140	226	6,948	500,738	6,519
September..	156	7,808	564,635	7,499	161	5,957	429,726	5,189
October....	186	9,225	662,560	9,121	163	7,101	511,291	6,466
November..	180	8,976	645,905	8,035	150	6,480	464,105	6,108
December..	155	7,462	541,141	7,084	154	6,740	485,427	5,944
Total ..	1,960	92,424	6,659,458	86,784	2,414	76,004	5,454,593	68,236
Decrease in trains handled.....								454
Increase (miscellaneous) loads over Clarks Gap.....								16,420
Increase tonnage over Clarks Gap.....								1,204,865
Increase loads (coal) at mines.....								18,548
Average tons per train, 1913.....								3,398
Average tons per train, 1912.....								2,260
Increase average tons per train.....								1,138

load. On the other hand, the operator has the necessary incentive to dump cars just as quickly as possible so that he may avoid an embargo.

There is one very interesting experiment which is being tried by one of the largest of the coal operators. This is the Gulf Smokeless Coal Company, with operations at Tams, just west of Elmore, on the Winding River branch. This company has bought a large tract of land near the Sewall's Point yard and dumps coal here whenever it has loading from the mines in excess of its dumping over the pier. In this way the company can keep its mines in full operation in slack times and still avoid any possibility of an embargo, and there has been accumulated a very large stack of coal which can be quickly dumped over the pier should there be a sudden call for it or should there be a strike at the mines. The railroad company makes a charge of \$1 a car for switching cars in to the Smokeless company's storage space and the cars are there dumped—hopper cars only, of course, are used—into pits by the coal company's employees, and the coal is transferred from the pits to the storage piles by a grab bucket; when the company desires to dump coal over the pier it reloads cars by means of the grab bucket working from the storage pile.

The Virginian Railway coal docks at Sewall's Point, Norfolk, Virginia, have been in operation now for about five years. When they were first designed the majority of railroad men who had studied the subject were of the opinion that a coal pier of this type was utterly impracticable. The Virginian is now operating its coal pier at an actual profit if we exclude interest on the investment. This is assuming that 300,000 or more tons are dumped a month over the pier. This result has been obtained very largely through the simplification of the methods of operation.

The engineering features of this pier were quite fully described in the *Railway Age Gazette* of April 21, 1911, page 951, but it is worth while outlining very briefly the method of operation and describing briefly the plant. The pier is a single unit; it consists of a yard of seven tracks, each with a capacity of about thirty cars, slanting down on a 1½ per cent. grade to a lead which drops into the lowest point of the yard, from which point cars are caught by a barney operated by a cable, and pushed up an incline to the car dumper, where they are emptied into self-propelled dock cars, which when emptied move by gravity over a switch back to the empties' track.

The coal cars themselves, gondolas and hopper cars, are switched from the receiving yard to the pier yard by a Mikado locomotive. The pier handles about 300 cars in ten hours, and two switching locomotives are used, one in a day shift and one

in a night shift. After the coal cars have been placed on the pier tracks—the seven tracks mentioned above—they are handled entirely by gravity and a cable. One man rides each car; he runs it down from the pier yard to the car dumper, bumping off the car already on the dumper.

The dumper tilts the car over bodily onto a great table, which turns it slowly over onto its side, dumping the coal out across the space of the table and down into the tractor. The tractor then moves forward under its own power until it is caught by a barney on a cable which carries it to the top of the pier, and from there it again moves forward under its own power to the point at which the coal is to be sent down through the chutes into the hold of the vessel. Each tractor is divided laterally into two compartments, so that it dumps into the holds of vessels a half a carload, 25 to 27 tons, at a time. The tractor then moves forward onto a center return track, down which it is carried by gravity. The tractor has about one hundred pounds of air, which is ample for safe braking down the return track.

The results that have been obtained on the Virginian pier have been obtained very largely through the adherence to a single guiding principle, that of simplification and dependence on accurate operation. When the pier began its operation eight tractors were used; at present but four are being used. The total force necessary to operate the pier consists of 25 men. The limiting factor in the speed of operation of the pier is, as would be surmised, the length of time that it takes to pick the coal car up, turn it on its side and dump it over the table into the tractor. It was estimated when the pier was first designed that its maximum capacity would be thirty-seven cars an hour. It cannot quite do this, but it can and does regularly handle over thirty cars per hour, or a total of 300 cars per day of ten hours.

The time required from the instant that a loaded car bumps the empty off of the dumper until it is replaced right side up and itself bumped off, is on an average a little less than 1 min. 50 seconds. The total time required for the complete operation, dumping of the car, movement of the tractor up the incline and out on the pier, and dumping of the tractor, is about 3 min. 35 seconds.

The actual cost of handling the coal, including the total operating expenses of the pier, but exclusive of the overhead charges, such as interest and the salaries of general officers not directly in charge of the pier, is about seven cents per ton. The charges for trimming the coal in the holds of the vessel, docking charges, etc., just about washes this cost when the pier handles 300,000 tons or more per month.

Electric power is purchased from the Virginia Railway & Power Company at a little less than two cents per kilowatt per hour.

A rather interesting feature of the reduction in cost which has been made is well illustrated by the way in which it was found that the number of tractors to be used could be reduced from eight to four. At first it was thought that if the tractor moved back down the return track at a greater speed than four or five miles an hour, it might result in a damage to the motors. It was also thought that a greater speed than this might be either dangerous or result in an uneven operation of the pier as a whole. By careful experimenting it was found that the motors were not affected by a speed of 40 or 50 miles an hour, and the only requisite for safe movement was skillful operators. It therefore paid to employ skillful operators even at higher wages.

That has been the experience in the operation of the pier throughout, that it paid to get good men, to pay them well, and to use a minimum number of men. Of course the greatest skill comes in an operation of the dumping machine which picks up the coal cars; everything has been brought to work in harmony with this operation. The man who controls this machine also controls the cable which brings the loaded coal car up to the machine. The tractor is, of course, in charge of its own motorman except when being carried up the incline to

the top of the pier level. These motormen must be level-headed men with good judgment and sureness of operation. The car riders are negroes who are paid well for such work, and who acquire a very considerable amount of quickness and mechanical skill. The car brought to the dumping machine must be stopped within a very few inches of an exact point, since the car rests on wooden stringers as it turns over onto its side, and is held in position by two iron arms which extend horizontally when the table is vertical and tighten down on the top of the car as the table turns over to a horizontal position.

The best record ever made by the pier was 7,500 tons dumped in 4 hours and 50 minutes.

The problem that the Virginian is in process of satisfactorily solving is that of so economically operating its mountain division as to carry coal over this division at a loss no greater than what can more than be made up by the profit on the other three divisions, and of operating the Second and First divisions at such a heretofore undreamed of low transportation cost per ton per mile that the profits of these two divisions will pay for the loss on the Deepwater division, and afford an interest return on the total investment of a very expensive road, and, finally, of so operating its terminal facilities at tidewater as to be able both to get the business through despatch and satisfactory service, and to keep the cost of performing this terminal operation down to an absolute minimum.

Comparing, now, what has already been done on the Virginian and on the Carolina, Clinchfield & Ohio, we find that the Clinchfield was logically carried to completion almost without initial mistakes, except, possibly, in the purchase of power. It would seem as if Mikado locomotives might well have been bought instead of the consolidation locomotives, and that more powerful Mallets might economically have been used on the heavy grades over the Blue Ridge mountains. The remarkably low operating ratio on the Clinchfield, and the even more remarkably low ratio of transportation to revenue is the result of an intelligent and sympathetic interpretation of the original scheme of the road and use of the facilities that were provided, and an unusually level-headed, economical system of simple operation. The Virginian, with its line twice as long and business nearly four times as dense, had certain initial mistakes to overcome. It had, moreover, a very much lower ton mile rate with which to make a showing of earnings, and a showing of low transportation ratio and operating ratio; on the other hand, it had a much greater volume of business. In the fiscal year ended June 30, 1913, the Clinchfield earned about 5 per cent. on the assumed investment, and the Virginian 4.3 per cent.

The Virginian has yet done almost nothing to develop the territory through which it runs except providing facilities for coal. There is comparatively little agriculture on the Deepwater or Third divisions, and on the Second and First divisions agricultural development is just beginning. The Virginian will undoubtedly develop a larger general merchandise business. It may either buy the Kanawha & Michigan, with which it could make a connection at the northern end, or take an interest in this road jointly with the New York Central Lines. In this way it might possibly become a link in a through route from the lakes to tidewater. It has a magnificent harbor and ample land on which to build facilities for handling export trade; but at present the road does not need it. It is demonstrating that it will be a paying investment simply as a coal road.

The Clinchfield, on the other hand, not having a direct outlet for its coal to tidewater, has a comparatively limited market at present for coal. On the other hand, with its extension north from Dante to a connection with the Chesapeake & Ohio it may well hope for a very considerable merchandise traffic from the Middle West into the jobbing centers of the Southeast, with possibly a return trade of fruit and vegetables. It is developing numerous tracts of land for orchards on its lines, is encouraging settlement by every means that it can, and has adja-

cent to its line in the Blue Ridge mountains large fields of various minerals. It has numerous industrials, including two large cement manufacturing plants, already located on its lines, and bids fair to induce a good many others to locate there.

AUTOMATIC TELEPHONE SYSTEM IN NEW DETROIT TERMINAL

The Michigan Central has installed a complete set of intercommunicating telephones furnished by the Automatic Electric Company, Chicago, in its new passenger terminal and yards in Detroit, Mich., and the yard across the river in Windsor, Ont. The board is arranged to handle all local calls in the terminal building proper, in yards and terminals in Detroit, extending down to the old terminal station and freight house about two miles, and from six to twelve telephones will be located in the Windsor yards and towers, three or four miles from the main board.

As this company makes four kinds of boards for this use, the nature of the traffic and the layout of the yards had to be considered. It was found that due to the length of lines, and the number of yard telephones now on party lines, the best board for this particular plant was what is known as a six party code ringing reverting call system, as this would meet all requirements and save considerable line construction.

The number of telephones originally ordered was 225. These were placed on 125 lines. In the yards nearly all lines have three or four telephones on them, and many of the telephones in the offices are equipped with extensions, to allow the chief clerk to answer all calls and handle all business for the officer whom he serves, except that which requires personal attention. The reason for using a party line system is to avoid excessive line construction through the yards. This excessive work might easily have exceeded the cost of the switchboard itself, as the lines are long and numerous and cable construction was absolutely imperative, due to the number of telephones involved, and the limitation of open wire construction.

The board is located in the telegraph office, and the maintenance, therefore, will be directly under the supervision of the wire chief. The board is equipped with alarm fuses and an automatic alarm, both visual and audible for most of the troubles that can occur in the apparatus. There are a number of these boards in operation completely isolated from all supervision—which are inspected only occasionally 80 per cent. of the time. It is found that the only thing really needed nine-tenths of the time is to see that the battery is in shape, the lines intact, and the board kept clean.

The method of operating this particular board is to remove the receiver from the hook, operate the dial on the telephone to the desired number, and push the ringing button the desired number of times to call the party. If this board were a single party line board or a harmonic ringing board the last procedure would be omitted, and the only operation necessary would be to select the numbers desired.

The saving effected by this installation is estimated about as follows:

Saving in operators' expense, about.....	\$2,500 per year
Saving in rentals on telephones required for local work (approx.).....	1,000 per year

While it is not easy to reduce the saving in time of employees to exact dollars and cents, it is estimated that this will approximate one week per year, per telephone in use, assuming that the saving on each call averages 18 seconds. A saving of 18 seconds in railroad operation may mean hundreds or even thousands of dollars saved or earned. If such a saving has to do with the movement of trains, it will always mean not alone the saving of the time of the man using the telephone, but also the saving of cost in operation.

In addition to the Michigan Central, the Kansas City Terminal, the Louisville & Nashville, the New York Central & Hudson River, the Illinois Central and other roads are now using these boards.

Depreciation of Locomotives and Shop Equipment

Comparison of the Different Methods Which Have Been Used With Suggestions as to Their Improvement

By L. R. POMEROY

With machinery, as with buildings, the first years of working show little or no reduction in value, and yet it is clear that, however long the working life may be, it really begins to shorten from the first, and the value must be depreciated accordingly.

In the case of locomotives, the wear and tear is provided for by the periodical running and general repairs, which are directly charged to operating expenses. The only point, therefore, left to be covered by a diminution value or depreciation charge is deterioration; deterioration is, however, affected by frequent, or periodical, restoration and the rate of depreciation must take this factor into consideration. The usual plan followed depreciates locomotives, or items of similar class, too rapidly, or at too high a rate, as due and proper allowance has not been considered, for periodical restorations and renewals. The peculiar

for the same period and rate, there remains \$348.65. By the straight line rate or law, which would be the equivalent of the curve rate given in the table, the rate equals $\$651.35 \div 10 \text{ years} = 6.5 \text{ per cent.}$

With the straight line, or equal annual instalment method, the same amount is deducted each year, notwithstanding the diminishing yearly balance and the amounts to be charged off become a larger proportion of the remainder, with advancing years. Thus, for example (from Table 1), at the end of the

100
fifth year, the remainder is \$500 and the rate equals $\frac{100}{500} = 20$
500

per cent. It therefore seems to the writer that each year or any time an inventory is taken, the rate of depreciation for the succeeding year should be a percentage based on the previous inventory value, and not on the original cost. From the foregoing it is evident that in every case, when the rate of depreciation is given, as a rate per cent., it should be stated whether the given rate is on the curve or straight line law, in order to correctly understand what is meant.

If by the straight line method, the approximate life is that obtained by dividing the 95 per cent., the total per cent. of de-

TABLE I
STRAIGHT LINE METHOD

YEAR	AMOUNT	RATE	AMOUNT DEPRECIATED	YEARS
Beginning	\$1,000	10%	\$100	1
End of 1st year	900	10%	100	2
" 2d "	800	10%	100	3
" 3d "	700	10%	100	4
" 4th "	600	10%	100	5
" 5th "	500	10%	100	6
" 6th "	400	10%	100	7
" 7th "	300	10%	100	8
" 8th "	200	10%	100	9
" 9th "	100	10%	100	10
" 10th " .....	.....	.....	\$1,000	

status of the locomotive is illustrated by the Scotchman who had a pocket knife nearly a half century old, and still in good order; it had had one new handle and three new blades.

Bearing on this point, Fig. 3 is presented to show how real is this element of restoration. Fig. 3 gives the approximate life, or renewal period, of the essential parts of a locomotive, which averages about 17 years. Since the computation was made, the writer came across a similar calculation applying to English locomotive practice, which was presented several years ago; this compilation is such a good check on the writer's figures that it is presented for this purpose. From the reasoning presented the real rate of depreciation is in the neighborhood of 2½ per cent. per annum. The rate, practically speaking automatically establishes the probable life of a locomotive, barring, of course, obsolescence.

Assuming the scrap value to be 5 per cent., there is left for total depreciation, over the whole period of useful life, 95 per cent. and the year's life equals 95 per cent. $\div 2\frac{1}{2}$ per cent. = 38 years. (This applies to the straight line formula.)

Likewise the total amount of depreciation, i. e., 95 per cent., divided by the years, fixes the rate. So that really the period selected as the normal life determines the rate.

Tables 1 and 2 are introduced to show the difference between the "curve" and the "straight line methods" alluded to, and Fig. 2 is presented as a general comparison for the same purpose.

With the straight line method, with a 10 per cent. rate, the principal is wiped out in ten years; while, with the curve method

TABLE II

$1 - \text{rate}^{\text{years}} = \% \text{Value.}$ $1 - (1 - \text{rate})^{\text{years}} = \% \text{Depreciation.}$

CURVE METHOD

YEAR	AMOUNT	RATE	AMOUNT DEPRECIATED	YEARS
Beginning	\$1,000.00	10%	\$100.00	1
End of 1st year	900.00	10%	90.00	2
" 2d "	810.00	10%	81.00	3
" 3d "	729.00	10%	72.90	4
" 4th "	656.10	10%	65.61	5
" 5th "	590.49	10%	59.05	6
" 6th "	531.44	10%	53.14	7
" 7th "	478.30	10%	47.83	8
" 8th "	430.47	10%	43.08	9
" 9th "	387.39	10%	38.74	10
" 10th "	348.65	10%	\$651.35	

preciation, by the rate; with the curve method this point is obtained by divided the log. of the per cent. of scrap value by the

log. of 1, minus the rate $\left(\frac{\log .05}{\log .1 - \text{rate}} \right)$. If the rate is, say,

5 per cent. the life becomes $\left(\frac{\log .05}{\log .95} \right) = 58 \text{ years, and if at}$

7 per cent. $\left(\frac{\log .05}{\log .93} \right) = 41 \text{ years.}$

The per cent. of value for any year, at any rate, equals $(1 - \text{rate})^{\text{years}}$. The curves on Fig. 2 were obtained in this manner.

For any given life in years, the rate can be found as follows: $1 - \frac{\text{years}}{\sqrt[32]{1.00 - .95}}$ (for 32 years life) — the rate is

$1 - \sqrt[32]{1 - .95} = 9 \text{ per cent.}$

There is, in the writer's opinion, an inherent defect, which applies to both the curve and straight line methods, although

*Extract from a paper on the "Physical Valuation of Railroads," read at the April meeting of the New England Railroad Club.

a curve was plotted "B," Fig. 4, which shows 50 per cent. value at the end of 30 years, and then dropping rapidly from 30 to 40 years life to 5 per cent. or scrap value. The $7\frac{1}{2}$ per cent. curve and the equivalent straight line law (from Fig. 2) for the corresponding life, is laid down for comparison.

From time to time, as these studies have progressed, the writer

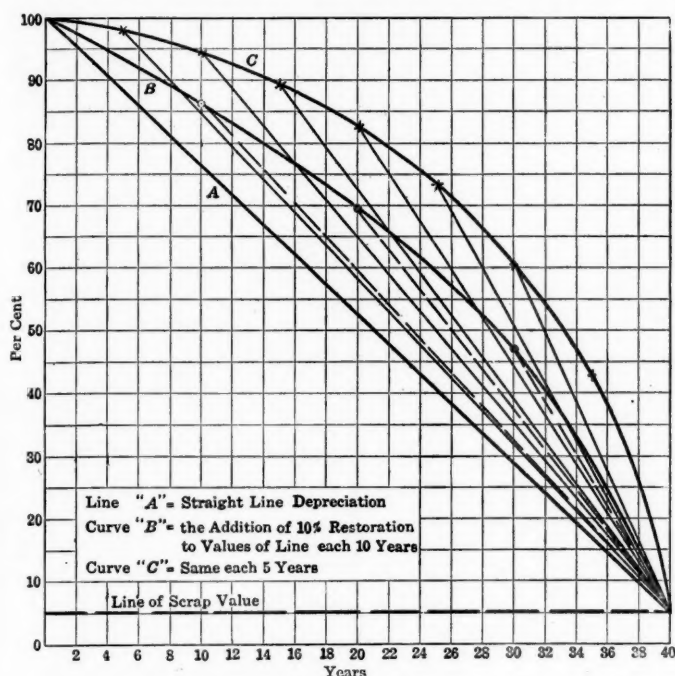


Fig. 1—Curves Showing Various Methods of Depreciation

discussed the subject with S. C. Stickney, and his suggestions have been exceedingly helpful as a contribution to the general subject, and the writer is permitted to incorporate a letter from Mr. Stickney, which directly bears on the point we are discussing. The letter is as follows:

Regarding the subject of depreciation, I understand the term "depreciation," as generally used, to mean the amount necessary to be written off

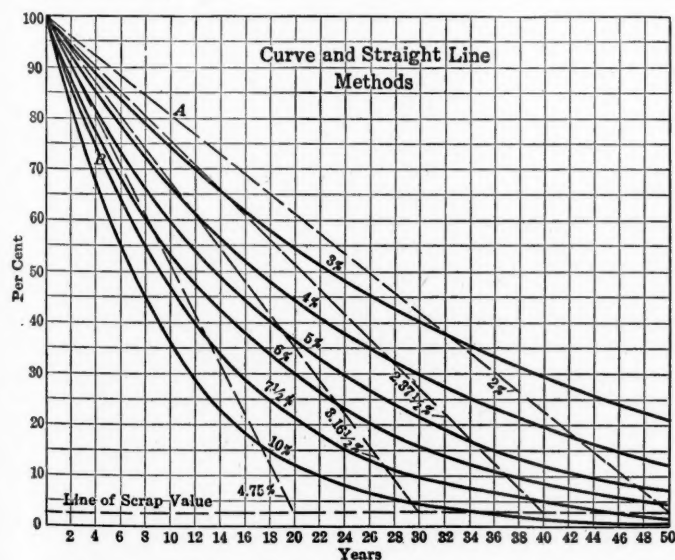


Fig. 2—Comparison of Curve and Straight Line Methods

the books each year, in order that when a structure or machine is no longer usable the book value will be approximately what the machine can be sold for as scrap.

Depreciation, however, is also used to mean the amount that must be deducted from the new value to ascertain the present value; the following is one way to get at this kind of depreciation:

To determine the present value of a locomotive in service and not on

the verge of obsolescence, I assume that different parts of the locomotive, each representing 10 per cent. of its value, will last respectively 1, 5, 9, 13, 17, 21, 25, 29, 33 and 37 years. I assume these parts are replaced as necessary with parts as good as new, but worth 10 per cent. less on account

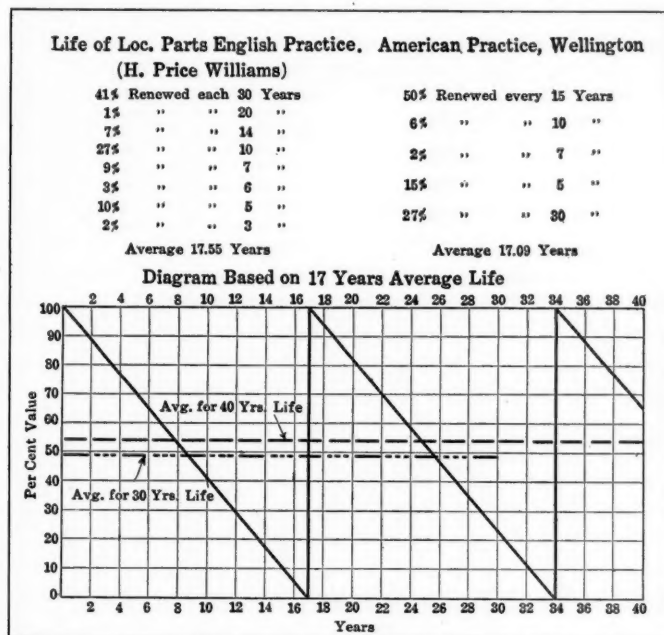


Fig. 3—Average Life of Locomotive Parts and Average Value at the End of 30 and 40 Years Life

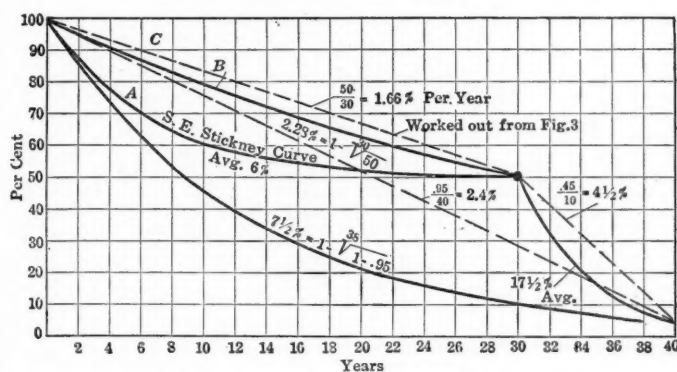


Fig. 4—The Stickney Method Compared to Other Schemes of Depreciation

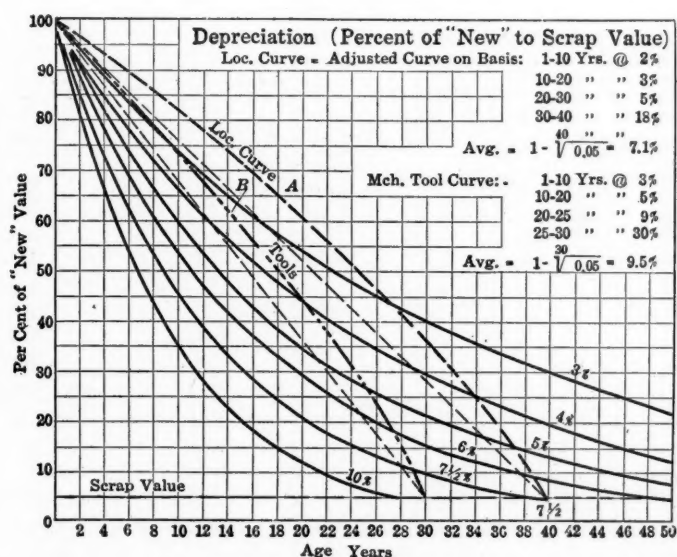


Fig. 5—"Adjusted" Depreciation Curves Compared With Curve and Straight Line Laws

of being attached to and used with old parts. From these assumptions Table A is prepared.

Plotting the figures on Table A indicates that the depreciated value ought to be as shown below:

Age	Value	Age	Value	Age	Value
New...	100 per cent.	10.....	60 per cent.	20.....	51 per cent.
1.....	90 per cent.	11.....	59 per cent.	21.....	51 per cent.
2.....	85 per cent.	12.....	57 per cent.	22.....	51 per cent.
3.....	80 per cent.	13.....	56 per cent.	23	
4.....	76 per cent.	14.....	55 per cent.	or	
5.....	73 per cent.	15.....	54 per cent.	over....	50 per cent.
6.....	70 per cent.	16.....	53 per cent.		
7.....	67 per cent.	17.....	52 per cent.		
8.....	64 per cent.	18.....	52 per cent.		
9.....	62 per cent.	19.....	51 per cent.		

Suppose the life of the machine to be N years. Its value at that time to be 6 per cent. Its value at N minus one year will be 5 per cent. greater, at N minus 2 years 10 per cent. greater, etc. The depreciation curve will therefore be level from 23 years to N minus 9 years, when it will run down at the rate of 5 per cent. per year.

The reason why the value of the machine at N minus one is 5 per cent. greater than its value at N years is that any one who has use for such

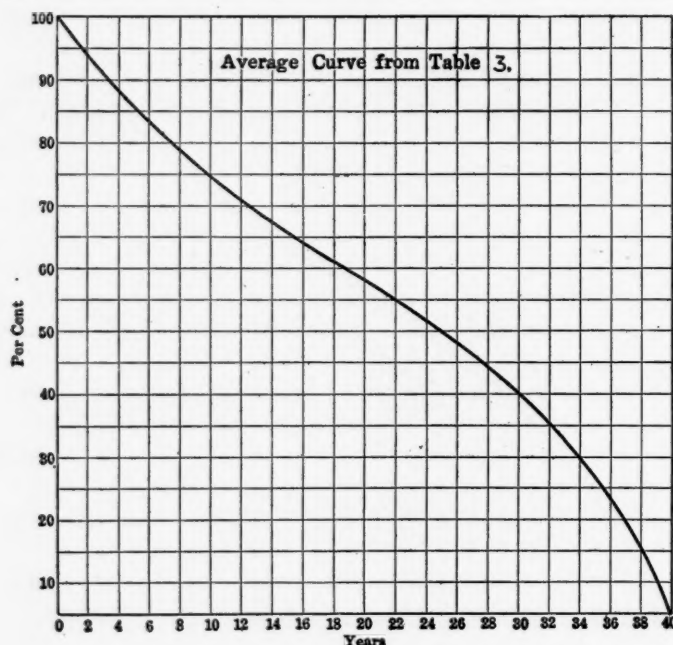


Fig. 6—Average Curve from Table 3

a machine for one year can afford to pay one year's interest on the cost of such a machine plus what he can sell the scrap for. If he has use for such a machine for two years, he can afford to pay 2 years' interest, etc.

This is offered for whatever it is worth, not as my idea of a practical method.

The conclusions of Mr. Stickney's letter are plotted as curve "A" on Fig. 4. And this curve appears in comparison with the straight and curved line methods discussed in connection with Fig. 2, and also with curve "B" in connection with the discussion of Fig. 4.

In Table 3, all the curves are tabulated for comparison, and column 9 is added giving the averages.

Fig. 6 is presented giving the averages of column 9, Table 3, in the shape of a curve.

Fig. 6 is therefore offered as a summation of all these studies and at least from the writer's viewpoint is an interesting result of the evolution described.

PORTUGUESE GOVERNMENT TAKES OVER COLONIAL RAILWAY LINE.—It is stated that owing to various breaches of contract between the Ambaca Company and the Portuguese government the latter has decided to take over temporarily the Loanda-Ambaca Railway. This line runs from Loanda on the coast of the Portuguese colony in Lower Guinea in Africa inland to Ambaca. The government will put the railway in order and develop it in accordance with the needs of the colony. The company's accounts with the state are in a chaotic state and have been under discussion for several years.

THE DEATH AND BURIAL OF COCK RAILROAD

BY BLEWETT LEE

Who killed Cock Railroad?

I, said the Interstate Commerce Commission,
Reduced his rates past all contrition,
I killed Cock Railroad.

Who saw him die?

I, said the heedless State Commission,
To run the road was my ambition,
I saw him die.

Who caught his blood?

I, Congress said, would always fail
To pay enough for carrying mail,
I caught his blood.

Who'll make his shroud?

I, said the reckless Legislature,
With foolish laws of every nature,
I'll make his shroud.

Who'll dig his grave?

I, said the Board of Aldermen,
He needs an ordinance—wait till then,
I'll dig his grave.

Who'll be the parson?

I, said the unjust Taxing Board,
I left him nothing he could hoard,
I'll be the parson.

Who'll be the clerk?

I, said the Shyster, for I saw
He stood no chance before the law,
I'll be the clerk.

Who'll be chief mourner?

I agitated Labor's cause,
I swelled the bills with full-crew laws,
I'll be chief mourner.

Who'll bear the torch?

I, said the greedy Financier,
With high finance I built his bier,
I'll bear the torch.

Who'll sing his dirge?

I, said the Heavy Shipper, see
That nothing got away from me,
I'll sing his dirge.

Who'll bear the pall?

I, said the Grafter, made my hay
With little rake-offs, day by day,
I'll bear the pall.

Who'll carry his coffin?

Said the Director, let me hold him,
It finished him, that road I sold him,
I'll carry his coffin.

Who'll toll the bell?

I, said the relentless Brotherhood,
Got all the wages that I could,
I'll toll the bell.

All the folks everywhere,

Sighed and sobbed, when too late,
Poor Cock Railroad's job
Was ill done by the State.

Construction of Milwaukee Avenue Viaduct, Chicago

New Reinforced Concrete Structure Built by C. M. & St. P. Containing Some Unusual Features of Design

By J. H. PRIOR

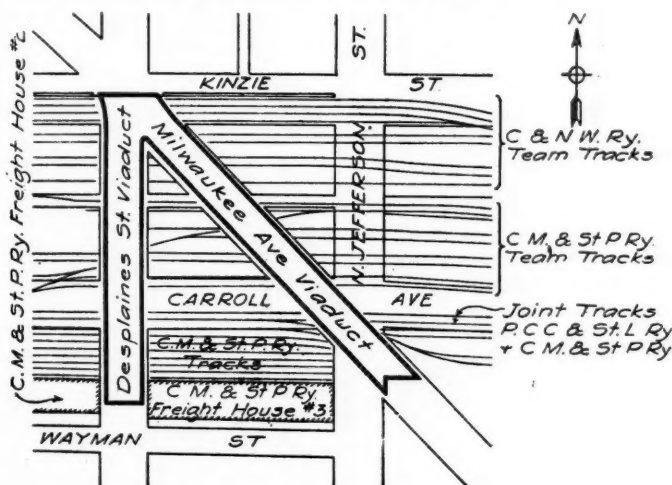
Formerly Engineer of Design, Chicago, Milwaukee & St. Paul, Chicago

Milwaukee avenue is one of the 14 farm roads which radiated from the early village of Chicago. Half a century ago it was known as the "Milwaukee and Chicago plank road," and was one of the principal highways entering the city. It has retained its importance as a highway, and at present probably 30,000 people pass daily in and out of the business district of Chicago on this street.

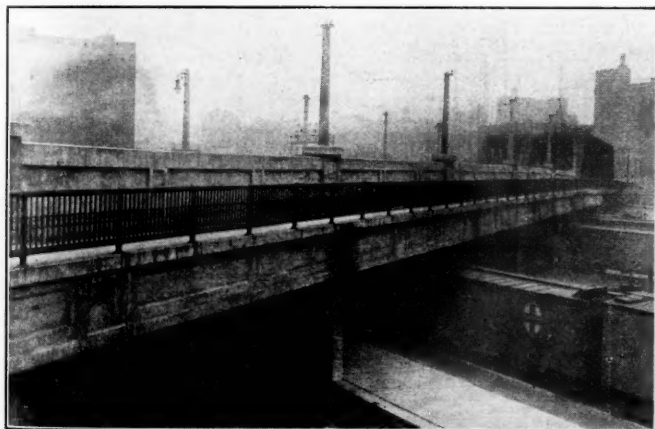
The viaducts described in this article carry Milwaukee avenue and Desplaines street over the tracks and team yards of the Chicago, Milwaukee & St. Paul, the Chicago & North Western, and the Pennsylvania, between Kinzie and Wayman streets. The railway tracks, which are approaching the central business district of Chicago, occupy a belt 460 ft. wide. Milwaukee avenue crosses these tracks diagonally, intersecting Desplaines street on the north in such a manner as to make the north end of the viaduct common to both streets. The Desplaines street viaduct crosses the tracks approximately at right angles and is 524 ft. long. The Milwaukee avenue viaduct has a total length of 665 ft.

The old viaducts on both Milwaukee avenue and Desplaines street were built in 1873. There is no record of the specifications and loading for which they were designed, but during the

ments was that the new bridges should carry the heaviest city traffic with a floor depth not much greater than in the old steel structure designed for the light traffic of 40 years ago. It was not difficult to meet this requirement in the design of the Desplaines street viaduct, as the city consented to a maximum rise of $8\frac{1}{2}$ in. in the street grade. In the Milwaukee avenue viaduct, however, it was necessary to design through girder spans,



Location Plan Showing Milwaukee Avenue and the Desplaines Street Viaducts



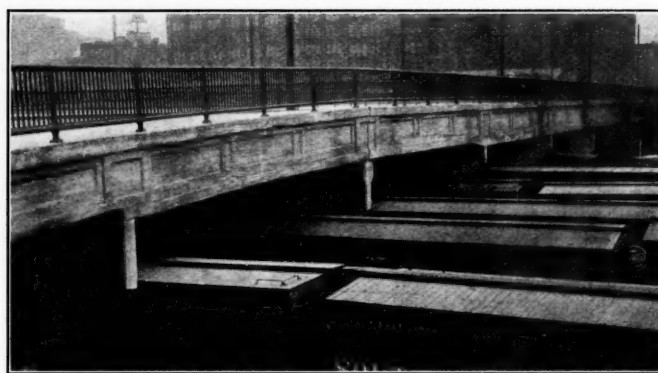
General View of Completed Milwaukee Avenue Viaduct

last few years of their life, various parts of the structures were overstressed more than 100 per cent. under traffic. This situation was remedied by the decision to replace these bridges with new structures designed under the city specifications, the loading in which is substantially equivalent to Cooper's Class A-2 loading for highway bridges. The new structures are both heavier than the original ones.

Preliminary estimates showed a reinforced concrete structure to be cheaper than a steel structure with a concrete floor, besides requiring less maintenance. It was, therefore, decided to build eight reinforced concrete spans on the north end of each structure, with a truss and a plate girder span on the south end of Milwaukee avenue, and three plate girder spans on the south end of the Desplaines street viaduct, where the spans required were longer than could be made of concrete. The truss and plate girder spans on the south end present no unusual features. This article, therefore, considers principally the eight reinforced concrete spans on the north end.

In designing these concrete spans, it was necessary to meet three rather unusual requirements. The first of these require-

as the street grade established by the city, together with the headroom which had to be provided over the railway tracks below, limited the floor depth to 4 ft. 1 in. from the top of street car rail to bottom of concrete. The main through girders "G" have an average length of 55 ft., with a maximum of 57 ft. 11 in. These are the longest bridge girders of reinforced con-



General View of Desplaines Street Viaduct

crete known to the writer to have been constructed up to this time.

As the main girders are a little more than 42 ft. apart, and the average perpendicular distance between the bents is slightly less than this, the beams "b-3" were placed at right angles to the bents "c" instead of at right angles to the girders "G," as is more usual in through girder construction.

The beams "b-3" afford nearly all the support for the heavily loaded central portion of the roadway under the street railway tracks. The beams "b-1" and "b-2" are also at right angles to

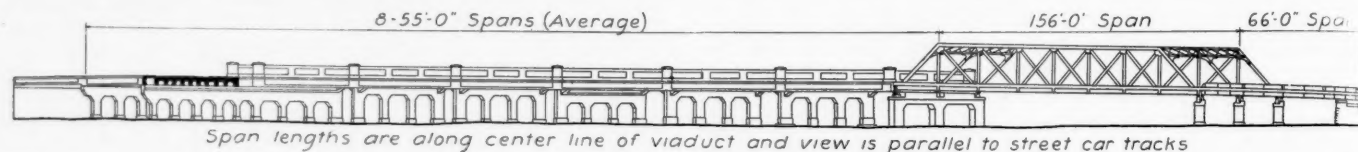
the bent "c" and carry most of the lighter loaded portion of the roadway. One end of the beams "b-1" and "b-2" is supported by the bents "c" and the other end is supported by the main girders "G."

This arrangement of the floor system has the additional advantage of reducing the total load to be carried by the girder "G," thus avoiding the inconveniently large dimensions which would otherwise occur. By arranging the beams in this manner and by the use of a special rail fastening, described later, it was possible to keep the depth of floor within the required limit.

In the opinion of the writer, the design would have been complete and sufficient without the short stringers "s," which ex-

and "g-2," concreted into the bent. The lower beams "g-2" of this grillage were made parallel to the bents to assist in distributing the load over the bent and the upper beams "g-1" were made parallel to the center line of the girders to afford a sufficient bearing area along the bottom of the girders.

Bronze plates "A" and "B," the upper faces of which were finished as a sliding surface, were fitted into the upper cover plates "E" of the grillage beams "g-1" by means of a lug. Cast steel plates "C" and "D" planed smooth and designed to slide upon the bronze plates "A" and "B," were concreted into the under surface of the main girder "G." It is believed that this detail will be a protection against excessive stresses due to ex-



General Elevation of Milwaukee Avenue Viaduct

tend between the beams "b-2," "b-3," etc., in a direction parallel to the center line of the viaduct. These stringers were, however, inserted at the direction of the municipal authorities.

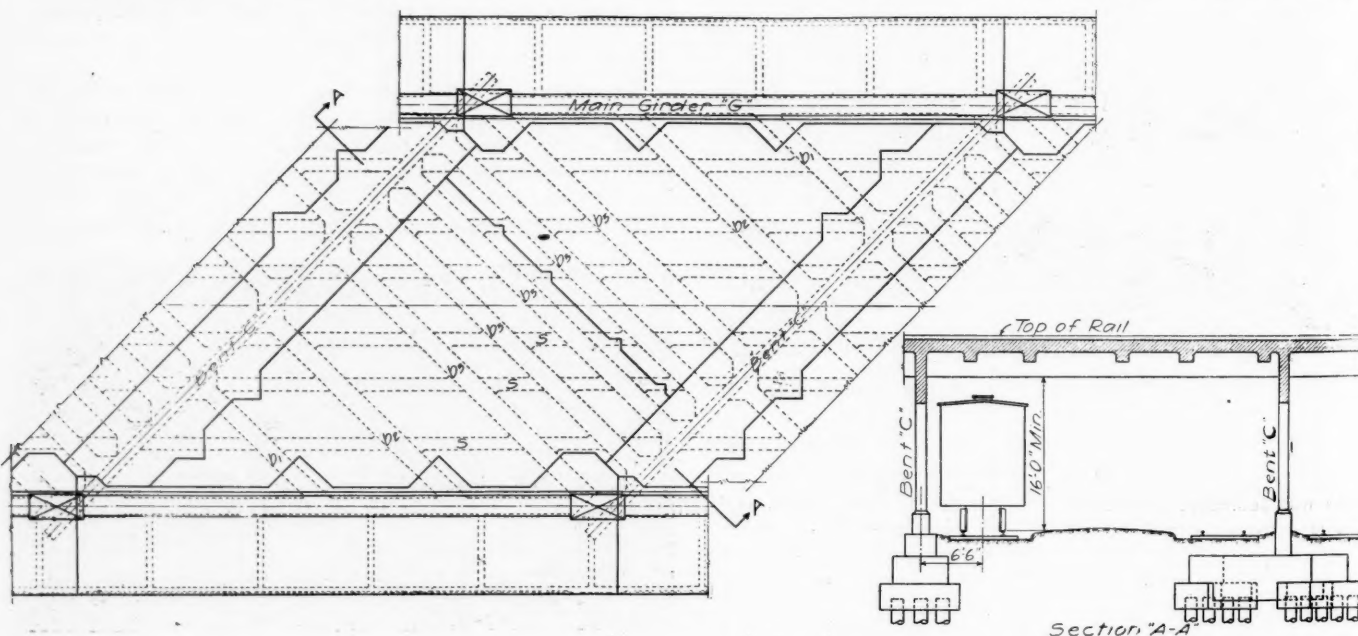
The main girders are 10 ft. 6 in. deep and 20 in. wide, reinforced with 28 1-in. bars spaced three in. apart horizontally and 2 in. vertically. They also contain a very considerable amount of vertical reinforcement necessary to provide for web stresses.

The floor on the Desplaines street bridge is similar in construction to that of Milwaukee avenue, except that as the street crosses the tracks at approximately 90 deg., there is no occasion for heavy girders.

The concrete spans in both viaducts were arranged in groups

pansion and contraction of the concrete structure, and that it will also prevent the formation of cracks around the bearings which are sometimes to be found in concrete structures not provided with adequate expansion joints. A similar provision was made for expansion under each of the beams "b-1," "b-2," etc., where they rest on the bents.

In order to maintain the former clearances for teaming purposes, it was necessary to place the bents midway between adjacent tracks, which were arranged in pairs. This limited the thickness of the bents to 1 ft. 3 in., necessitating the use in the columns of 1 per cent. of vertical reinforcement with hoops and spirals. The columns "c-1" are supported directly upon pile foundations, but the column "c-2" is supported upon the beam



Plan and Cross Section of a Typical Span in the Milwaukee Avenue Viaduct

of three, the ends of the spans which rest on the two center bents of each group being made fixed ends, and the ends which rest on the outside bents expansion ends. The fixed ends of the beams "b-1-2-3," were built as a monolith with the cross beam "c-0," but at the expansion end they rest upon the bent "c-2" and are tied together by a diaphragm, expansion being provided by means of a specially designed sliding bearing.

In the Milwaukee avenue viaduct, the main girders "G" at their expansion end are carried on special expansion bearings. The lower half of this bearing consists of two beam grillages, "g-1"

"c-5" spanning the tunnel of the Illinois Tunnel Company, which runs directly beneath both viaducts about 50 ft. under ground. The ends of the beam "c-5" are carried upon the pile foundations "f-2," and "f-3." The columns "c-1," "c-2," etc., support the cross beams "c-0."

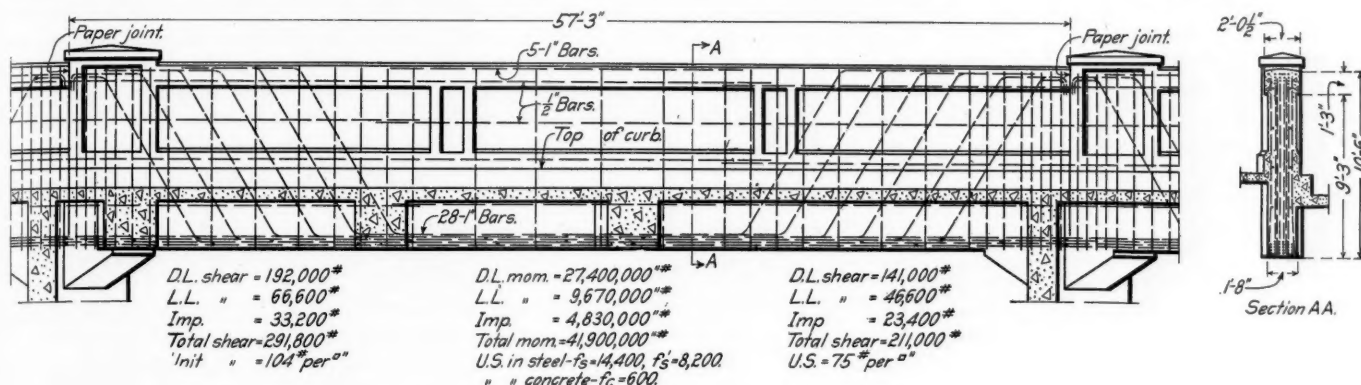
The reinforcement used in a typical bent carrying the fixed end of the girders is shown in an accompanying drawing. A construction joint was made along the line "j-1, j-2, j-3, j-4," etc., between the column and the beam "c-0" which was built as a monolith with the column.

With the depth of floor and long spans required on Milwaukee avenue, it was not possible to use ties and ballast with the 9 in. Trilby rail ordinarily used by the Chicago Railways Company, whose tracks cross the viaduct. A special rail chair was, therefore, provided for a 7 in. Trilby rail, which the Chicago Railways Company consented to use. This reduced the available floor depth from 4 ft. 1 in. to 3 ft. 6 in. only, whereas if ties and ballast had been used, the available depth would have been re-

duced an additional 7½ in., besides greatly increasing the dead load weight of the floor.

The rail chair, was designed to interfere as little as possible with the beam action of the concrete and the reinforcement of slabs when placed in the structure, and at the same time to produce a suitable anchor and sufficient bearing for the rails. This was accomplished by making the main part of the chair in two pieces, the bed plate and the anchor plate, which are entirely independent of each other.

The bed plate "G" is approximately 16 in. square and is 1½



Elevation and Details of Reinforcement in One of the Main Girders

duced an additional 7½ in., besides greatly increasing the dead load weight of the floor.

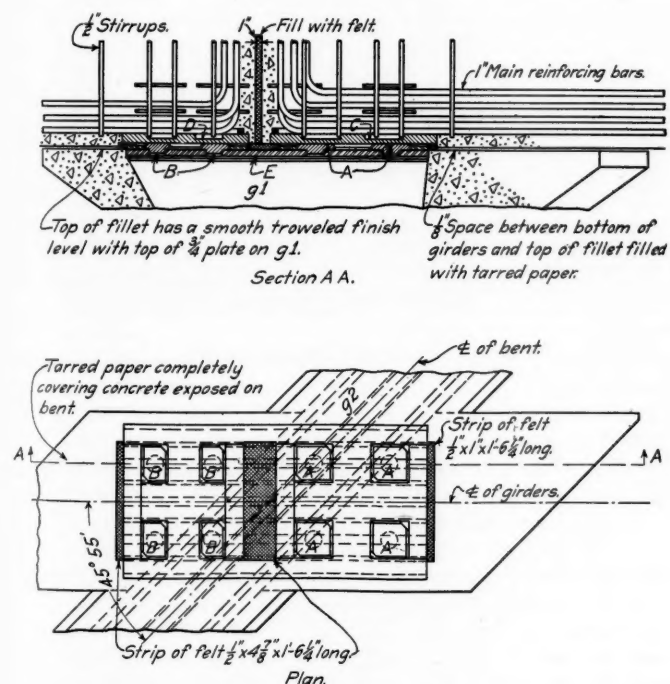
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The bed plate "G" is approximately 16 in. square and is 1½

duct, owing to the greater allowable thickness of floor, ties and ballast were used.

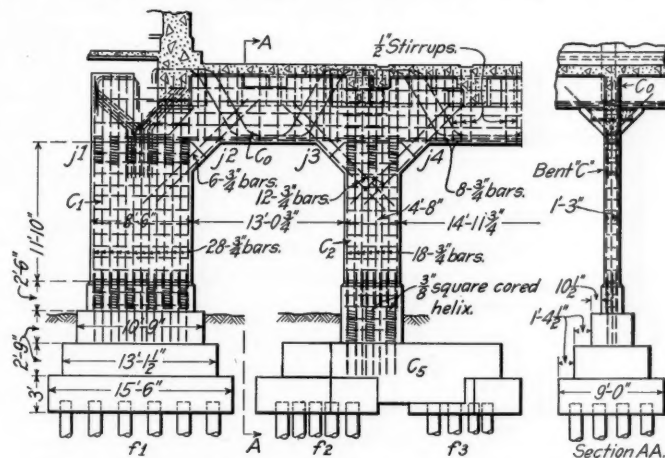
The second condition imposed on the design was that the bridges be constructed with only a reasonable interference with the properties of the public and municipal utilities at present occupying the surface or sub-surface space. These properties included the tracks and wires of the Chicago Railways Company; the tunnel of the Illinois Tunnel Company; the lighting and power conduits of the Commonwealth-Edison Company; the telephone conduits of the Chicago Telephone Company, and the water pipes and sewers and electric light wires and poles of the municipality of Chicago.

The method of providing for the tracks of the Chicago Railways Company has already been described. Their wires were



Details of the Expansion Joint Under One of the Main Girders

in. thick, the perimeter being embedded in the concrete. There are four square holes in the bed plate through which the sockets of the separate anchor plate "H" extend. The anchor plate "H" is a casting with a lower bar running transversely to the rail. There are two upright projections, "K," each of which terminates in a socket for receiving the head of a "T" bolt. The anchor plate "H" is placed in the floor between the upper and lower

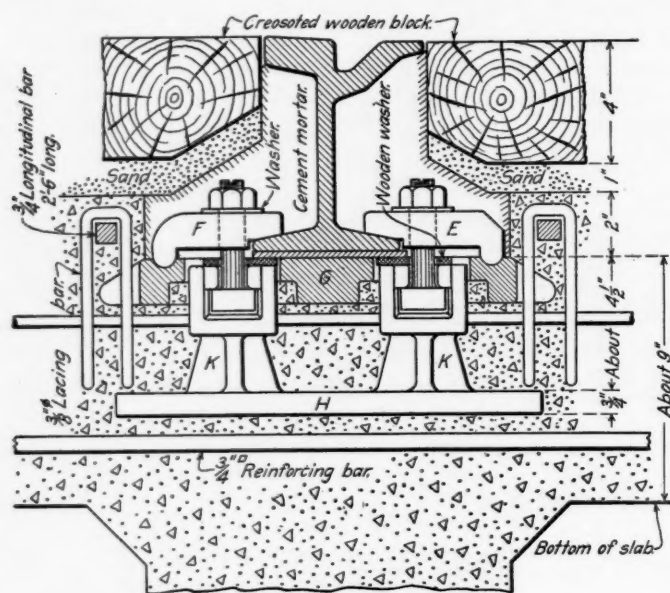


Part Elevation and Section of a Typical Bent in the Milwaukee Avenue Viaduct

strung overhead from reinforced concrete trolley poles placed over each bent. On Milwaukee avenue provisions for the lighting and power conduits of the Commonwealth-Edison Company and the telephone conduits of the Chicago Telephone Company were made by embedding 3½ in. Orangeburg fiber conduits in concrete in the space directly beneath the sidewalks on each side of the viaduct. On Desplaines street these conduits were placed in wrought iron pipes supported on ledges on the stems of the sidewalk "T" beams.

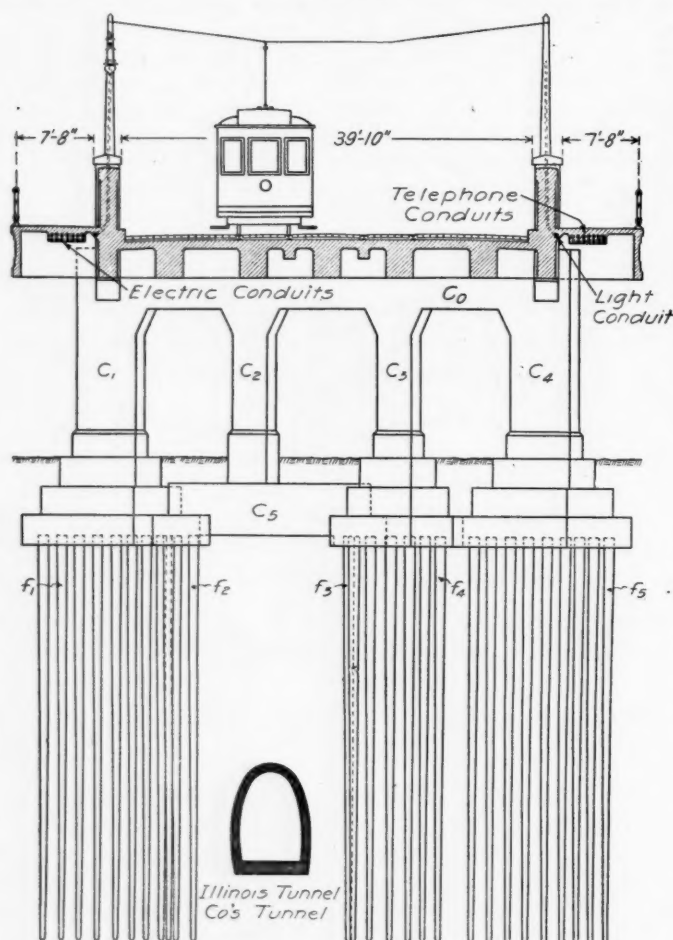
The tunnel of the Illinois Tunnel Company occupies a position in Milwaukee avenue approximately beneath the center line of

the street at an elevation about 38 ft. below city datum. It was not found possible to secure any support for the viaduct within



Details of the Rail Fastening Used to Decrease the Depth of Track Construction on the Viaduct

the space directly above the tunnel, and accordingly the column "c-2," which is located over the tunnel, is supported on a beam



Elevation of Typical Bent in Milwaukee Avenue Viaduct

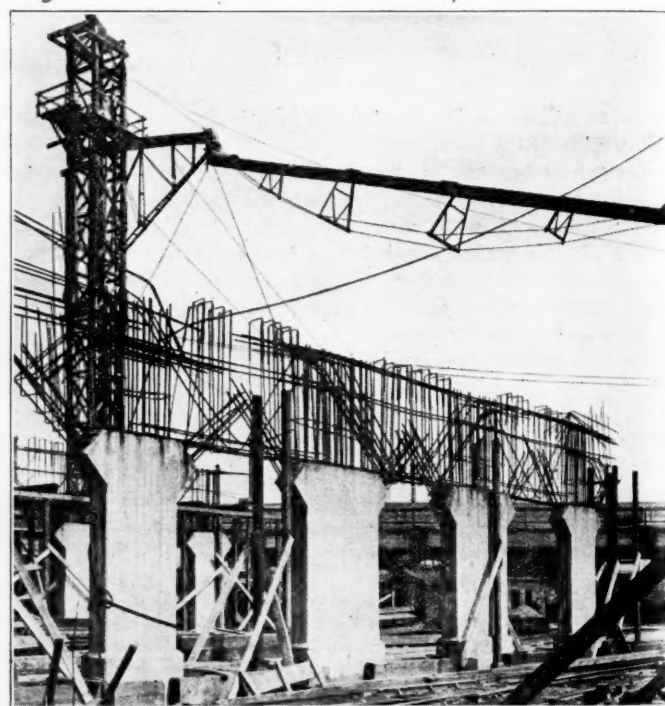
"c-5" which spans the tunnel and is supported on the pile foundations "f-2" and "f-3."

The third condition imposed on the design was that the new

structures should be built practically without interference with the present railroad tracks and without infringing on their lateral or vertical clearance. This was necessary, as the tracks on the lower level are busy terminals of importance to the railroad companies concerned. To meet this requirement special falsework was used on Milwaukee avenue, in which the distance from the lowest point of form work to the bottom of the permanent concrete floor was only 8 in.

In order to interfere as little as possible with traffic across the viaducts during their reconstruction, the Milwaukee avenue structure was rebuilt first, traffic being carried over the old Desplaines street viaduct. After Milwaukee avenue viaduct was completed, traffic was turned over it, and Desplaines street viaduct was rebuilt. Plans for Milwaukee avenue were completed and the structure 75 per cent. completed before plans for Desplaines street were started. The work was done by contract; separate bids for each viaduct being invited. The work was done by two different contractors, using different methods in the placing of concrete.

Certain conditions were imposed upon the contractors, the



Tower and Chute Used in Construction of Desplaines Street Viaduct

main one being that there should be no interference with the operation of trains on the joint main tracks of the Milwaukee and the Pennsylvania, the old main tracks of the North Western, or the tracks serving the Adams Express Company's platform, or the Milwaukee freight house. All other tracks under the viaducts are used as team tracks, the cars being spotted at night. Therefore, any of these tracks could be blocked under the viaduct during the day between the hours of 7:00 a. m. and 6:00 p. m., but had to be left open for switching at night. An overhead clearance of 15 ft. 6 in. above top of rail was required.

In the construction of Milwaukee avenue viaduct the concrete in the footings, with the exception of the bent between the truss span and the three girder spans, was placed by means of a mixer mounted on a flat car. The car was placed on the tracks adjacent to the footings, and concrete deposited through a chute. Material was taken from cars on adjacent tracks and delivered to the mixer in wheelbarrows. For placing concrete in the superstructure, a tower about 50 ft. high was erected near the material tracks between bents No. 5 and No. 6. A 1/2-yd. cube mixer was located on the ground adjacent to the tower,

discharging directly into an elevator or bucket. The concrete was hoisted to the top of the tower, dumped into a chute, and distributed by means of push carts of 6 cu. ft. capacity. A large part of the material was delivered to the mixer in wheelbarrows from cars located on the material tracks, but a portion was brought to the vicinity of the mixer by teams and then taken to the mixer in wheelbarrows.

For work at the north abutment and the two north spans, a mixer was placed on the north approach and concrete discharged directly into place or distributed in push carts. In concreting the sidewalks and curbs on the steel spans, a $\frac{1}{4}$ -yd. mixer mounted on wheels was used, and the concrete distributed in wheelbarrows. Materials were delivered to these mixers in wheelbarrows from storage piles in the street at each end of the viaduct. Near the south approach, a portable saw mill was erected. Electric power was used in operating the mixers, elevator and saw mill.

In the construction of Desplaines street viaduct, the concrete for both the substructure and superstructure was placed by means of a tower and chute, the chute being long enough to deliver concrete to any portion of the structure.

In the Milwaukee avenue viaduct there are approximately 4,000 cu. yd. of concrete and 600,000 lb. of reinforcing steel. In the Desplaines street viaduct there are approximately 2,100 cu. yd. of concrete and 315,000 lb. of reinforcing steel. The concrete in general was a 1:2:4 mix, using crushed limestone, but the columns were 1:4, and some of the footings were 1:3:6. The cement gun was used for pointing after the forms were removed. Tests of the concrete at 28 days showed the following results for cylinders 8 in. in diameter and 16 in. long:

For 1:4 concrete—2,500 lb. per sq. in.

For 1:2:4 concrete—2,000 lb. per sq. in.

By agreement with the other railway companies involved, the work was designed by the Chicago, Milwaukee & St. Paul, C. F. Loweth, chief engineer, and the writer as engineer of design. The concrete work in Milwaukee avenue viaduct was built by L. K. Sherman & Co., Chicago, and in Desplaines street viaduct by Brennen Construction Company, Chicago. The steelwork on both viaducts was erected by the railway company's forces. The field engineering, superintendence and inspection for the railway, both of the steel and concrete, were under the direction of R. J. Middleton, engineer of track elevation for the C., M. & St. P.

WHO ARE THE BOSSES OF OUR RAILWAYS?*

I am not going to give you any biographical sketches of railway presidents—there are only a few hundred or so of them anyhow, of railroads big and small. Besides, they are not the bosses any more. They still retain the titular designation of "president," and their corporations' by-laws clothe them, ostensibly, with power. Their duties, however, are now simply those of subordinates of the government. It is their principal duty to try and get money wherewith to operate the railroads. In spending it they have very little to say. The point I make is that when a person ceases to have the power to fix the price of his goods or services, or to fix the compensation of those who serve him, he ceases to be "the boss" of the situation.

The "bosses" of our American railways today are too numerous to mention in an after-dinner speech, for one would have to call the roll of the entire voting population of our country, and add to that the non-voting female population that yet remain without the elective franchise.

In order that the millions of railway "bosses" may not all be called upon all the time to handle the details of railway bossing, there are quite a number of representative "bosses," selected, who keep busy continuously. Among them are:

The president of the United States, and his official retinue of

several thousands, including the all-powerful Interstate Commerce Commission, with its imposing staff;

48 state governors;

96 United States senators; and

435 congressmen;

157 state railway commissioners;

1,700 state senators;

5,500 state assemblymen.

It is an interesting fact that most of the foregoing enumerated railway "bosses" have become really active, and I might say aggressively dominating in railway affairs since I last attended a dinner of the Central Railway Club (in 1908). It was about that time that "teeth" were put into railway regulation, as those responsible for legislation were pleased to describe their enactments.

Why was the change made? In short, it was because the public became dissatisfied with the way the old "bosses" conducted the railways. It is not necessary to recite the counts in the indictment against the former "bosses," for my thought is running in another channel entirely. For the purpose of this address, it may be conceded freely that railway management was not all that it ought to have been. Concede that the change of "bosses" was made in the hope and with the high intention that the public would be better served. And concede, too, that many wrongs have been remedied and many needed reforms inaugurated. I am glad of all the good things that have happened. I am not sure that all that has happened has been for the ultimate good of the railways or of the public.

I am here to maintain, and that vigorously, that under the old "bosses" there were many mighty projects for the up-building of our nation that were brought to brilliant realization. I am here to assert that the wrongs perpetrated by the old "bosses" were small in comparison to the great, big deeds of beneficence to our people that they performed. But because some of them sinned, all have been denuded of their former power, and the dignity of their offices has been minimized.

To boss our railways wisely, successfully, and to the joint advantage of the owners and the public, whoever undertakes to do the "bossing" must possess, not less, but more of brains, experience, foresight and willingness to assiduously apply every faculty to the proper service of the railways than did the "bosses" who have been dethroned. If we are to have more and better railways under the new regime than under the old, the new "bosses" must learn to say "yes" when it ought to be said, and "no" when a strong negative is needed. It will not do to say "yes" always when the proposition is to spend the railroad's money, and to always say "no" when the proposition is to permit the railroad to earn that which it needs to serve the public adequately.

To "boss" property owned by others, is a serious undertaking. Under the old way, of handling railroads, with whatever faults attached thereto, the "bosses" could be bounced by the owners, if unsatisfactory. Under the new way, the "bosses" are the people, and who is going to bounce the people if they go wrong? Nobody! Nothing can save the railroads from unwisdom and neglect, except that these new "bosses" shall fit themselves to be skilled railway administrators, whose judgment is to be depended upon.

It takes a man many years to reach the eminence of being a railway general manager, and more years from then on to be a president. It constitutes a life of arduous work. How long does it take to transform a private citizen, who never had anything to do with railroads, into a railway commissioner with omnipotent power? Only so long as for the appointment to be signed by the state or federal executive. The average official life of a legislator is not more than three years—probably less. The average term of service of our railway commissioners in the states does not, I imagine, exceed five years, generally less. A governor who serves four years is the exception. From this estimate, it can be seen at a glance how casual an incident in a man's lifetime is his possible political official connection with

*Abstract of an address by George A. Post, President, Railway Business Association, at the dinner of the Central Railway Club, at Buffalo, N. Y., on March 12.

railway affairs. And we all know that as soon as a man goes out of office, his peculiar and fervent enthusiasm is over, and his studies are at an end.

Something must be done to insure the longest possible service for those who may be appointed to our railway regulatory bodies. Seats upon that all-important bench (the Interstate Commerce Commission) must be made especially attractive to men of most profound attainments and superb equipment for the exercise of the plenary power with which they are clothed by law. The emoluments ought to be made satisfactory to the minds of men who ought only to be considered therefor. So far as health and life will permit, a man once chosen for that duty should remain there, with no lure of more lucrative place to distract his attention, but settle down, knowing that he is earning enough to provide satisfactorily for his family dependents, and with an eagerness to write his name large in the annals of government, and assured that he will have the opportunity to do so. An Interstate Commerce Commission of constantly or frequently shifting personnel cannot do the job as it ought to be done. The re-appointment of Commissioners Clark, Harlan and Clements cannot be too highly commended, because they have certainly grown stronger and more efficient with each year of service. The prospective retirement of Commissioner Prouty is to be deplored by all who base their hopes of wise regulation of our railroads upon the efficiency of the regulators.

Under the present trend of political thought, which selects legislators by direct primaries, it is certain that the average of legislative service will be shortened rather than lengthened. Hence, it is of the utmost importance that legislative bodies shall not try to legislate in detail about railway matters, about which they can possibly know but little, but content themselves with giving general instructions to expert bodies created for continuous service.

There never was a truer saying than that "Too many cooks spoil the broth." There is another maxim that has some application to the existing railway situation, which is to the effect that "What is everybody's business is nobody's business."

If all the people insist upon having a hand in "bossing" the railroads, and they certainly have assumed the power, then all the people must strive to know more about the way railroads ought to be conducted. They must apply themselves seriously to a study of what is necessary to constitute a prosperous railroad. They must know and realize the necessity of a railway surplus. If the corner grocer, or the shipper of merchandise thinks that he favors fixing railway freight rates by popular clamor, it would be well if they would think carefully of what might happen to them if the prices they charged for their commodities were to be fixed by the decrees of their customers, and then strike a happy medium in the method of regulating "big business," as they call it, while retaining perfect freedom to do as they like about their own business.

HOW THE RAILWAYS "MISLEAD" THE PUBLIC*

By IVY L. LEE,

Executive Assistant, Pennsylvania Railroad

I wonder whether you would have invited me to appear on this occasion had you known of a speech which was made in Congress yesterday by Senator Cummins. Senator Cummins is reported in the newspapers of today as having, among others, made these remarks with reference to the five per cent. freight rate increase:

In connection with the proceeding before the commission there is in progress the most comprehensive, energetic and persistent campaign I have ever witnessed to make the people of the country believe that the effort of the government to regulate railroads, railway rates and railway practices has resulted in dismal, disastrous failure.

The railroads are trying to mislead and pervert the judgment of the people. They are trying to awaken sympathy by false pretenses. They are

trying to deceive the country with exaggerated cries of suffering and distress.

This extraordinary campaign has filled the newspapers with headlines, with despatches. It gives dinners and holds public banquets where the eloquence of orators paints lurid pictures of empty treasuries, of worn-out tracks, of falling bridges and dilapidated equipment.

This luncheon would seem, therefore, to be one of those occasions where we have already been convicted of trying to deceive the people and ourselves as well, and to "awaken sympathy by false pretenses."

To be quite frank, it hardly seems fair that a speech of that kind should be made in Congress. We are accused of having conducted a nefarious campaign to mislead the public and to prejudice the case now before the Interstate Commerce Commission. And yet, a senator of the United States comes out upon the floor of the Senate and proclaims that the case we are trying to make out is absolutely without warrant. I don't condemn Senator Cummins for his speech. It seems to me that from his point of view it is quite a proper speech to make, assuming that we also have the right to reply. But to accuse the railroads of trying to mislead the public hardly seems fair when an effort is being made to prejudice the case in the United States Senate.

Now since Senator Cummins has made this speech, I would like to tell you precisely what the railroads have done in this freight rate campaign. I happen to have personal knowledge of what I speak. We are accused in this speech of having inspired newspaper headlines, and I know that there are a large number of people in Washington who believe the attitude of the press in this matter has been stimulated by subterranean methods hardly worthy of public approval.

Now I know what has been done. Before this case was presented to the Interstate Commerce Commission, we came to the conclusion that the methods used in 1910 were unfortunate in that we had not taken our case to the people as well as to the commission. We therefore asked our officers to go here and there before chambers of commerce, boards of trade, business organizations and so forth and present to them the case we expected to present to the Interstate Commerce Commission. Before the hearings were held in the presence of the commission some of our representatives went to the commission itself and said in substance:

"We don't intend to rely upon the casual newspaper reports for the people of this country to learn the reasons which we shall present to you and upon which we ask for this increase in rates.

"We are going further than that. We propose after each hearing to make a short, succinct extract of every important fact which we present to you under oath. We intend to send such a resumé to every important newspaper in the United States; we intend to send it to the mayors of cities, to the secretaries of chambers of commerce in the various cities, to members of every state legislature, to every state railroad commission, to postmasters in the principal cities, to college libraries, city libraries, and professors of economics in colleges. We intend that the people interested shall be fully informed as to every salient fact which we present to you. This, not to appeal from the commission to the people, but to let the people know our position."

We asked the commission, before that plan was undertaken, if they had any objections to make. We received a letter which is on file, a letter stating that the commission had no comments to make thereon. From this letter we had the right to assume that the commission had no criticism to make on this scheme, assuming, of course, it was carried out in good faith.

We have followed this plan carefully; we have tried to bring to public attention every pertinent fact which we have presented to the Interstate Commerce Commission. We have tried to make that campaign as intelligent, as comprehensive, as energetic as it could have been made. We have restricted reference absolutely to matters of record. In order that everything should be open and above board, we have sent to the commission several copies of every one of our publications. That is the entire

*From an address before the Wilmington, Del., Chamber of Commerce, on April 14, 1914.

extent of our newspaper campaign. If that is not a fair way to go to the people with a proposition, what is the meaning of the word fair?

The campaign has been successful to a very large extent. The people are with us, and public sentiment in this country today appears to be largely in favor of the advance in freight rates. But it is inconceivable to a large number of people that this sentiment should have been developed by perfectly straightforward methods. We have been chided in the past for not having taken people into our confidence. When we take the people into our confidence, take them into our confidence with such palpable sincerity and completeness that we gain in return the confidence and support of the people, some of our friends in Washington think the devil has surely been at work somewhere, although they are unable to discover the exact method.

The railroads have been accused—they were accused yesterday—on the floor of the Senate of the United States of having discharged a large number of employes for the purpose of affecting the decision of the Interstate Commerce Commission in this case. Now, gentlemen, that is a very serious charge. Our company, it is true, has discharged or furloughed about 38,000 men since the first of last October. But is it conceivable that a company like ours—and you must pardon me if I refer more or less to the Pennsylvania Railroad, because it is with that railroad I am employed and therefore most familiar—is it conceivable that a company like ours, with its record of harmonious relations with its employees, with a knowledge that so many of its employees must have of its actual condition, is it conceivable that we would play fast and loose with the daily bread of 40,000 employees for the sake of affecting the decision of any tribunal?

If that were conceivable, consider this fact: Business began to fall off with us very decidedly about the first of October. We were at that time employing on the lines east of Pittsburgh about 142,000 men. This drop in business conditions continued through November and December with an accelerating pace.

Our officers had been instructed all over the system to economize wherever possible, to cut things down as near to bed-rock as they could. A good many men were laid off and a good many more were put on short time. We came up then to the month of February, hoping continually that business would improve and that drastic cuts either in personnel or in the service would be rendered unnecessary.

We had up to that time resisted what seemed to be the common sense of the proposition and kept on a very much larger number of men than business required. But what was the result in the month of February of hoping against hope and trying to fight off what we all regarded as only a device of last resort? This was the situation when the February figures came in in the middle of March: We found that our business for the month of February this year was \$2,000,000 less than in the month of February last year. These figures are gross. In February of 1914 we found that we had earned almost exactly what we did in February in 1910, that is \$15,000,000 gross on the lines east of Pittsburgh. Yet we found that during the month of February, 1910, we earned net revenue of \$3,000,000 out of that \$15,000,000 gross. In 1914 we earned the same amount of gross, namely, \$15,000,000, but only \$1,200,000 net, a loss of \$1,800,000 in net. We found that this same gross business in 1914 of \$15,000,000 was done with about 13,000 more men than we had in February, 1910.

With such a serious depletion of revenue, such a tremendous cut in net, a failure in that particular month even to earn the dividend on the Pennsylvania stock, it was obviously necessary to make a drastic cut in expenses. The way it was reasoned out was that the same number of men ought to be able in 1914 to handle the same amount of business that the same number of men did in 1910, especially as during the interval practically all of these men had had from five to ten per cent. increases in wages.

That was a situation which could not be trifled with; these were figures that were plain to everyone; it is perfectly certain that if these figures had not been plain to everyone, we would not have been permitted to discharge all of those men without facing a Congressional investigation. What would have been even worse would have been any thought of such a painful policy except under conditions of peremptory necessity.

To accuse the railroads, the Pennsylvania Railroad along with others, of trifling with matters of that kind seems to betray a state of mind on the part of some people in Congress, and some people, serious minded people throughout the country, which is at bottom the most serious phase of the whole railroad situation.

VOLUME OF SECURITIES NOT EXCESSIVE

W. H. Williams, third vice-president of the Delaware & Hudson, with a view to answering the unfounded charges to the effect that the railroads of the country have issued stocks or bonds without securing full value therefor, has prepared a table showing that, measured by the amounts per mile of all tracks, the average capitalization for 1911 actually decreased 2.02 per cent. from the average in 1890.

Mr. Williams makes this calculation on the basis of a consolidated balance sheet, including all the railroads of the country except those in Class 3 and terminal and switching roads. The table shows:

Cost of Road and Equipment—	1911	1890
Per mile of road.....	\$63,945	\$54,518
Per mile of main tracks.....	57,206	51,013
Per mile of all tracks.....	42,010	42,451
Stocks and Bonds—		
Per mile of road.....	82,399	60,767
Per mile of main tracks.....	73,715	56,859
Per mile of all tracks.....	55,165	47,317

Deducting investments in stocks and bonds of other corporations and showing the results only for securities issued on account of the cost of road and equipment, the average per mile of road in 1911 amounts to \$63,388, an increase over 1890 of 13.95 per cent.; an average per mile of all main tracks of \$56,708, an increase of 8.95 per cent.; and an average per mile of all tracks of \$42,437 or a decrease of 2.02 per cent.

Comparing 1909, the latest year for which the statistics are available, with 1890, it is found that the cost of road per mile of all tracks was \$38,121 as compared with \$40,033 in 1890, while the cost of equipment in 1909 was \$3,783 as compared with \$2,305 in the earlier year; in other words, a large proportion of the increases from 1890 to 1909 represent the higher cost of equipment, per mile, which has been made necessary because of the expansion of traffic. The decrease in the cost of road per mile during the 19 years was 4.78 per cent., while the cost of equipment increased 64.12 per cent. There is no doubt that 1911 would show a still greater relative increase in the cost of equipment. The meagre increases in the volume of securities, as compared with track mileage, are surprising considering the great improvements which have been made during the last 20 years. Charges to capital account during these years have been most conservative.

In the 21 years from 1890 to 1911 the cost of road and equipment, plus working assets, increased 111.48 per cent., while the number of passengers carried one mile increased 180.24 per cent. and the number of tons of freight carried one mile increased 233.02 per cent.

Further statistics are given to explain the well known facts concerning the increase in the power and capacity of locomotives and freight cars.

AN INDIAN LOCOMOTIVE'S RECORD.—Engine 512, an eight-wheel type locomotive of the Great Indian Peninsular Railway of India, has a record of having run nearly 1,000,000 miles; or say, for 30 years about 2,800 miles a month. The locomotive has been in service since 1884 as a passenger and mail engine. It is still in good working order and engaged in the same kind of service.

General News Department

The number of cars of freight passing over the Middle division of the Pennsylvania Railroad in the first 15 days of April is reported as amounting to 81,000, or a little greater than during the same period of 1913.

The mail car of Southern Pacific train No. 3 was robbed of some registered mail near Los Angeles, Cal., on the night of April 20. A single robber intimidated the clerks with a gun, and he jumped off the train within a few miles after leaving Los Angeles.

At Hilltonia, Ga., on the night of April 18, a passenger train of the Savannah & Northwestern was stopped by an armed mob and the conductor and engineman were kidnapped. There has been a strike of conductors on this road and the despatches indicate that the kidnapping has a direct connection with the strike.

At a convention of the railroad department of the American Federation of Labor held in Kansas City last week a resolution was adopted providing for a petition to the United States Industrial Relations Commission to grant a public hearing to representatives of the shop employees of the Illinois Central and the Harriman Lines who struck in 1911 and who now declare they were "locked out."

A board of arbitration has been selected to consider the wage controversy between the New York, Chicago & St. Louis and its telegraph operators, and hearings will begin at Chicago on May 10. The arbitrators are Judge Julian Mack, of the United States circuit court; J. A. Gordon, general manager of the Chicago Great Western, and J. A. Newman, vice-president of the Order of Railway Telegraphers.

The United States Civil Service Commission announces examinations May 20 for the position of junior railway signal engineer; salary from \$1,080 to \$1,500 yearly. Applicants must be not over 35 years old. Examinations will be made on the same day for junior mechanical engineer, junior electrical engineer and junior structural engineer, all for positions under the Interstate Commerce Commission in the Department of Valuation of Railways.

The Wheeling & Lake Erie has contracted with the Cleveland, Cincinnati, Chicago & St. Louis for trackage rights from Wellington, Ohio, eastward to a point near Cleveland, about 32 miles, the contract to run one year. The Wheeling & Lake Erie has a line from Harmon to Cleveland, but the object of the new arrangement is to provide for running freight trains through between Toledo and Cleveland by a shorter route. Thus far the traffic is light.

Threats of a general strike of railway employees in Italy, which have been noted in the press despatches for two or three weeks past, were reported on April 20 as having died out. The number of employees involved was about 115,000. The government had made extensive preparations for resisting the strike and had occupied some of the stations with troops. Arrangements were made to have the vessels of the navy carry the mails to the islands. The men get poor pay, but the government, which operates the railroads, is poor. Besides asking for a large increase in the rates of compensation per day, the men also made a number of demands relative to shorter and more regular hours, with a full rest day every week. It is said that the possibility of a strike had already caused a marked falling off in tourist traffic.

The Norfolk & Western has issued a "safety bulletin" to indicate the progress being made by the safety department of the road toward accident prevention. The bulletin includes a number of pointers to agents and other employees, suggesting safe methods, statistics showing the reduction in accidents since the safety committees were established, and a statement of the improvements made by the various division safety committees. The bulletin also includes a chart showing that in the eight

months since the safety work was inaugurated on this road the number of injuries to employees per month has been reduced from 447 to 302; while the engine mileage in that time has shown practically no change; also a number of statements showing the comparative percentage of efficiency in accident prevention on various divisions and in various shops, based on the number of men employed.

Watch Inspection on the New Haven

C. L. Bardo, general manager of the New York, New Haven & Hartford, announces that hereafter men engaged in the movement of trains must have their watches inspected twice a year, for the renewal of their certificates, and each certificate must be presented to the local inspector twice a month for the purpose of having entered thereon a record of watch comparisons. Watches must be cleaned every year. The company will require employees to carry open face watches, this for the purpose of having watch faces with the figures uniform and in the normal position. The general time inspector is Webb C. Ball.

What Do Passengers Think of You?

Some few years ago, while I was employed in a ticket office, a Bohemian farmer called me up on the phone, asking for information about rates to San Antonio. These people are not as easy to understand things as some others, and will enter into no transaction until they thoroughly understand it. After giving this man the rate of ticket for himself, then himself and wife, time of departure and arrival and various things too numerous to mention, he started all over again by asking some foolish question; and I lost my temper and said: "Oh, I will tell you next week," and started to hang up the receiver. He replied: "That's all right. I didn't want to go until next week, no way."

Now, this man's good nature prevented him from becoming insulted and going over some other road; but this remark of mine, no doubt, was heard by other passengers at the window who were not so well supplied with good nature. What did they think?—*Sunset Central Traffic Department Bulletin.*

Government Figures Explain Rise in Maintenance Cost

The Bureau of Railway News and Statistics, Chicago, has issued the following:

"In figures showing that wages paid to labor engaged in the building and repair of railway cars increased from 27 to 50 per cent. in the 15 years between 1897 and 1912, and from 7 to 18 per cent. in the 4 years between 1909 and 1912, just compiled by the Bureau of Labor Statistics of the United States Department of Labor, railway managers of the country have been given by one branch of the national government a direct answer to recent charges made against them before another branch, the Interstate Commerce Commission, that expenditures for maintenance have been excessively expanded.

"The government figures are compiled from private car building shops and railroad shops engaged wholly or mainly in the building and repairing of steam railroad cars, both passenger and freight, and both wooden and steel. In selecting the establishments from which to secure the data the government Bureau of Labor Statistics undertook to represent every state in which the building and repairing of steam railroad cars is of important proportions so that the results obtained are of the most representative character possible.

"The data afforded are the first of the kind compiled and given out by the government in almost six years, and are of graphic significance as a reflection of the serious inroads made upon the railway dollar in recent years in the important branch of maintenance of equipment.

"Taking as 100 the average wage per hour paid distinct classes

of workers in car building and repairing in the 10-year period 1890 to 1899 the government figures give the relative hourly wage in each year from 1890 to 1912. There is shown a gradual decline from 1890 to 1896, and then a decided and unchecked rise which in the 15 years since has resulted in the following enormous changes:

	Relative wage per hour	
	1897	1912
Cabinet makers	97.2	136.7
Carpenters and car builders, wood.....	98.2	127.6
Laborers	98.5	127.1
Machine woodworkers	95.4	133.1
Machinists	99.4	139.7
Painters	100.8	128.0
Pipe fitters	99.6	136.3
Tinners	102.3	150.1
Upholsterers	96.2	144.2

"The rise in wages per hour represented ranges from 27 per cent. in the case of painters to 50 per cent. in that of upholsterers. In power to purchase a painter's labor the railway dollar of 1897 shrank to 79 cents by 1912, while in the case of upholsterers it shrank to 66 cents!

"What this means is appreciated only in connection with the fact that 60 per cent. of equipment maintenance represents wages. On this basis, \$268,000,000 of the \$448,000,000 paid by roads of class I and II in 1912 went in pay to labor. Had 25 per cent. of this wage been saved (less than the rise in payments of any class above), the equipment maintenance account would have been smaller by over \$67,000,000.

"In four years from 1909 to 1912 the advance in wages per hour ranged from 7.2 per cent. for machine woodworkers to 8.9 for machinists; 10.0 for carpenters; 10.5 for car repairers; 12.1 for painters; 13.0 for laborers; 13.3 for cabinet makers; 13.8 for truck builders; 15.2 for tinners; 17.4 for pipe fitters, and 18.1 for upholsterers.

"Were the general average only 10 per cent. higher \$27,000,000 could have been saved on the 1912 bill for equipment maintenance had the 1909 wages been in effect. As the total increase for equipment upkeep in the same time was \$84,000,000 there is accounted for thus some 33 per cent. of the expansion which has so horrified the soul of Clifford Thorne.

"Moreover the bureau's figures for 1913 show that there was a further increase in the wages of railway shopmen for that year over 1912."

State Ownership a Failure

(St. Louis *Globe-Democrat*.)

In addition to the heavy financial burden which the State Railroad has already been to the government of Texas, money must now be spent in rebuilding a portion of the line that was destroyed by recent floods. At one point more than one mile of track and roadbed were washed away, and there are many other gaps of 50 to 300 feet wide that will have to be rebuilt before traffic can be resumed. State railroad ownership has proved a big failure in Texas. Not many years ago there was a strong sentiment among a faction of the democratic party here in favor of constructing a north and south trunk railroad through the state. The present state-owned railroad was built originally as an adjunct to the state penitentiary at Rusk, but was extended to Palestine during the administration of Gov. T. M. Campbell, the prospective ultimate northern terminus being Dallas. Lack of funds caused a cessation of the construction work when Palestine was reached. Although it forms an important connecting link between the International & Great Northern and the St. Louis Southwestern, it has never done a profitable business. If the state can find a buyer the line will probably be sold.

Railway Operation More Safe Than Chicago Streets

More than three times as many people, in proportion to population, were killed on the streets of Chicago during 1913 than were killed by all the railways of the United States, including passengers, employees, trespassers and others, in all classes of accidents, according to a statement issued by the Bureau of Railway News and Statistics.

"In a population of approximately 100,000,000," says the statement, "there were killed in all classes of accidents on the railways 10,550 persons, of whom 5,558 were trespassers; only 759 of the remainder were killed in accidents to trains.

"Records of the coroner's office show a total of 802 persons

killed on the streets of Chicago during the 12 months of 1913. With a population only approximately one-fortieth as great, there was a total killed one-thirtieth as great, 321 fatalities per 1,000,000 inhabitants on the streets of Chicago against only 105 per 1,000,000 inhabitants, due to railway operation, more than one-half of which were trespassers.

"During the year there were 136 persons killed on Chicago streets by automobiles alone, or within 5 of the number of passengers killed by all the railways in accidents to trains.

"In other accidents on the streets there were killed 584 persons, the causes being such as bicycles, elevated railways, street and steam railways and motorcycles. How serious the question of automobile accidents alone has become is shown by the fact that there was an increase of fatalities from this cause from 98 in 1912 to 136 in 1913, or 38.8 per cent. In New York there was a simultaneous increase from 226 to 302, or 33.6 per cent."

Questions in Regard to Industrial Lines

The Interstate Commerce Commission has sent out to railroad companies a set of 30 questions in regard to industrial tracks located on the railroad companies' lines.

The first four questions ask for the name, the location, ownership and details of the incorporation and list of stockholders of each industrial line, and the relationship of the stockholders of the industrial lines to industries served by the railroads.

Questions 5, 6 and 7 call for a complete statement of the history, ownership and control of the industrial lines; equipment obligations; considerations for the issue of stock and bonds, and list of bondholders and their relation with the industries served by the railroad.

Questions 8, 9, 10 and 11 call for a list of all the industries located adjacent to each industrial line; the length of track, and other characteristics of each industrial line; leases and contracts and trackage rights in regard to each, and a statement of the cars and engines operated on each.

Question 12 asks for the length of haul between each trunk line interchange and each industry served. Question 13 calls for a map showing trunk line interchanges, location of industries and team tracks. Questions 14, 15 and 16 ask for details of the character of service rendered and the compensation therefor, and arrangements for the interchange of equipment.

Questions 17-20 ask for information as to the tariffs filed by industrial lines, rates for L. C. L. freight, the method of way-billing freight and arrangements in regard to passenger service.

Question 21 asks if tracks are in such condition as to permit trunk line engines to make deliveries at points of placement.

Question 22 calls for a detailed statement of the general balance sheet, income account, and profit and loss account for the year ended June 30, 1913.

Questions 23 and 24 ask for an analysis of traffic and revenue and an analysis of operating expenses for the fiscal year 1913.

Question 25 asks for a statement in regard to each officer of the industrial railroad; as to his relations with the controlling industrial company.

Question 26 asks for a statement of the extent to which passes are interchanged with common carriers.

Questions 27 and 28 ask for a statement of the length of track outside of the plant enclosure of the controlling industry, and details of any changes made since the organization of the industrial line as regards points of physical interchange with connecting carriers, relocation of trunk line railways in the vicinity of the plant, etc.

Question 29 asks for the names of persons from whom right-of-way was required, the purchase price, and other details.

Question 30 asks whether the industrial railway leases cars or engines from or to the trunk line, and asks for a statement of the terms of such leases.

Central and Western Association of Car Service Officers

The annual meeting of the Central and Western Association of Car Service Officers was held at the Hotel La Salle, Chicago, on April 16, with President D. C. Frederick, superintendent of transportation of the Chicago, Peoria & St. Louis, in the chair. Among other resolutions adopted were several recommendations of the committee on per diem which were referred to the Association of Transportation and Car Accounting Officers. These included an amendment to per diem rule 5, providing that re-

claims shall be based on an arbitrary number of days to be determined by the roads in each territory; also a rule providing that per diem shall cease in the case of worn-out cars on notice from the handling line to the owner of the car, and until notice has been received from the owner to destroy or repair the car. There was an interesting informal discussion on the question of pooling box cars for the purpose of eliminating the present wasteful practice of hauling empty cars back and forth to return them to an owner who has no occasion for them in times of car surplus. The discussion led to the adoption of a resolution to appoint a special committee of five members to submit a report at the next meeting, which will be held in Chicago on November 12, 1914. Officers were elected as follows: President, E. T. Kennan, auditor and car accountant, Indianapolis Union, Indianapolis, Ind.; vice-president, J. R. Pickering, superintendent of car service, Chicago, Rock Island & Pacific, Chicago; secretary, W. E. Beecham, car accountant, Chicago, Milwaukee & St. Paul Railway, Chicago; treasurer, F. M. Luce, Chicago.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.**—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May 5-8, Hotel Pontchartrain, Detroit, Mich.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.**—A. G. Thomason, Boston, Mass.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.**—W. C. Hope, 143 Liberty St. New York.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.**—R. O. Wells, I. C. R. R., East St. Louis, Ill.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.**—E. H. Harman, St. Louis, Mo.; 3d Thursday and Friday in May.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.**—E. B. Burritt, 29 W. 39th St., New York.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.**—H. G. McConaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.
- AMERICAN RAILWAY ASSOCIATION.**—W. F. Allen, 75 Church St., New York.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.**—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.**—E. H. Fritch, 900 S. Michigan Ave., Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.**—J. W. Taylor, Karpen Building, Chicago. June 15-17, Atlantic City, N. J.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.**—A. R. Davis, Central of Georgia, Macon, Ga. Next convention, July 20-22, Hotel Sherman, Chicago.
- AMERICAN SOCIETY FOR TESTING MATERIALS.**—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa. Next annual meeting, June 30 to July 4, Hotel Traymore, Atlantic City, N. J.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.**—Chas. W. Hunt, 220 West 57th St., New York; 1st and 3d Wed., except June, July and August, New York. Annual convention, June 2-5, Baltimore, Md.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.**—J. R. Wemlinger, 11 Broadway, New York; 2d Thursday of each month, at 2 P. M., 11 Broadway, New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.**—Calvin W. Rice, 29 W. 39th St., New York. June 16-19, St. Paul-Minneapolis, Minn.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.**—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.**—C. G. Phillips, Highland Park, Ill. Annual meeting, June 24, Minneapolis, Minn.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.**—C. W. Egan, B. & O., Baltimore, Md. Next convention, May, St. Paul, Minn.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.**—Jos. A. Andreucetti, C. & N. W. Ry., Chicago. Semi-annual meeting, June 12, Hotel Denis, Atlantic City, N. J. Annual convention, October 19-23, Chicago.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.**—P. W. Drew, 112 West Adams St., Chicago. Next convention, May 19-22, New Orleans, La.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.**—G. P. Conard, 75 Church St., New York. Annual meeting, Hotel Chalfont, Atlantic City, N. J., June 18-19.
- ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.**—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.**—L. D. Mitchell, Detroit Graphite Co., Detroit, Mich. Meeting with American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.**—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.**—Clement H. McLeod, 176 Mansfield St., Montreal, Que.; 1st Thursday, October, November, December, February, March and April, Montreal.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.**—Aaron Kline, 841 Lawler Ave., Chicago; 2d Monday in month, except July and August, Lytton Bldg., Chicago.
- CENTRAL RAILWAY CLUB.**—H. D. Vought, 95 Liberty St., New York; 2d Fri. in Jan., May, Sept. and Nov. and 2d Thurs. in March, Hotel Statler, Buffalo, N. Y.
- CIVIL ENGINEERS' SOCIETY OF ST. PAUL.**—Edw. J. Dugan, P. O. Box 654, St. Paul, Minn.; 2d Monday, except June, July, August and September, Old State Capitol Bldg., St. Paul.
- ENGINEERS' SOCIETY OF PENNSYLVANIA.**—Edw. R. Dasher, Box 75, Harrisburg, Pa.; 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.**—Elmer K. Hiles, Oliver Bldg., Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.
- FREIGHT CLAIM ASSOCIATION.**—Warren P. Taylor, Richmond, Va. Next convention, May 13, Hotel Galvez, Galveston, Tex.
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.**—A. M. Hunter, 605 Grand Central Station, Chicago; Wed. preceding 3d Thurs., Transportation Bldg., Chicago.
- INTERNATIONAL RAILWAY CONGRESS.**—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.
- INTERNATIONAL RAILWAY FUEL ASSOCIATION.**—C. G. Hall, 922 McCormick Bldg., Chicago. Annual convention, May 18-21, Hotel La Salle, Chicago.
- INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.**—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July 14-17, Hotel Sherman, Chicago.
- INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.**—A. L. Woodworth, Lima, Ohio. Next convention, third Tuesday in August.
- MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.**—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.
- MASTER BOILER MAKERS' ASSOCIATION.**—Harry D. Vought, 95 Liberty St., New York. Next annual meeting, May 25-28, Hotel Walton, Philadelphia.
- MASTER CAR BUILDERS' ASSOCIATION.**—J. W. Taylor, Karpen Building, Chicago. June 10-12, Atlantic City, N. J.
- MASTER CAR & LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.**—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.
- NATIONAL RAILWAY APPLIANCE ASSOCIATION.**—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Next convention, March 15 to 19, 1915, Chicago.
- NEW ENGLAND RAILROAD CLUB.**—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.
- NEW YORK RAILROAD CLUB.**—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.
- NIAGARA FRONTIER CAR MEN'S ASSOCIATION.**—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.
- PEORIA ASSOCIATION OF RAILROAD OFFICERS.**—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Thursday in month, Jefferson Hotel, Peoria.
- RAILROAD CLUB OF KANSAS CITY.**—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.
- RAILROAD MASTER TINNERS, COFFERSMITHS & PIPEFITTERS' ASSOCIATION.**—U. G. Thompson, C. & E. I., Danville, Ill. Annual meeting, May 19-22, Marquette Hotel, St. Louis, Mo.
- RAILWAY BUSINESS ASSOCIATION.**—Frank W. Noxon, 30 Church St., New York.
- RAILWAY CLUB OF PITTSBURGH.**—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.
- RAILWAY DEVELOPMENT ASSOCIATION.**—W. Nicholson, Kansas City Southern, Kansas City, Mo.
- RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.**—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.
- RAILWAY FIRE PROTECTION ASSOCIATION.**—C. B. Edwards, Mobile & Ohio, Mobile, Ala. Annual meeting, 1st Tuesday in October.
- RAILWAY GARDENING ASSOCIATION.**—J. S. Butterfield, Lee's Summit, Mo.
- RAILWAY SIGNAL ASSOCIATION.**—C. C. Rosenberg, Bethlehem, Pa. New York, May 27 and 28. Annual meeting, Bluff Point, N. Y., September 22-24.
- RAILWAY STOREKEEPERS' ASSOCIATION.**—J. P. Murphy, Box C, Collinwood, Ohio. Next convention, May 18-20, Hotel Raleigh, Washington, D. C.
- RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.**—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations, Atlantic City, June 10 to 17.
- RAILWAY TELEGRAPH & TELEPHONE APPLIANCE ASSOCIATION.**—G. A. Nelson, 50 Church St., New York. Meetings with Assoc. of Ry. Teleg. Supts.
- RICHMOND RAILROAD CLUB.**—F. O. Robinson, C. & O., Richmond, Va.; 2d Monday in month, except June, July and August.
- ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.**—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.
- ST. LOUIS RAILWAY CLUB.**—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.
- SALT LAKE CITY TRANSPORTATION CLUB.**—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah; 1st Saturday of each month, Salt Lake City.
- SIGNAL APPLIANCE ASSOCIATION.**—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.**—Carl Nyquist, La Salle St. Station, Chicago.
- SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.**—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.
- SOUTHERN & SOUTHWESTERN RAILWAY CLUB.**—A. J. Merrill, Grant Bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., 10 A. M., Candler Bldg., Atlanta.
- TOLEDO TRANSPORTATION CLUB.**—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio; 1st Saturday in month, Boody House, Toledo.
- TRACK SUPPLY ASSOCIATION.**—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.
- TRAFFIC CLUB OF CHICAGO.**—W. H. Wharton, La Salle Hotel, Chicago.
- TRAFFIC CLUB OF NEW YORK.**—C. A. Swope, 291 Broadway, New York; last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.
- TRAFFIC CLUB OF PITTSBURGH.**—D. L. Wells, Erie R. R., Pittsburgh, Pa.; meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.
- TRAFFIC CLUB OF ST. LOUIS.**—A. F. Versen, Mercantile Library Building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.
- TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.**—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 16, Jacksonville, Fla.
- TRANSPORTATION CLUB OF BUFFALO.**—J. M. Sells, Buffalo; first Saturday after first Wednesday.
- TRANSPORTATION CLUB OF DETROIT.**—W. R. Hurley, Supt.'s office, L. S. & M. S., Detroit, Mich.; meetings monthly, Normandie Hotel, Detroit.
- TRAVELING ENGINEERS' ASSOCIATION.**—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, August, Chicago.
- UTAH SOCIETY OF ENGINEERS.**—Fred D. Ulmer, Oregon Short Line, Salt Lake City, Utah; 3d Friday of each month, except July and August.
- WESTERN CANADA RAILWAY CLUB.**—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.
- WESTERN RAILWAY CLUB.**—J. W. Taylor, 1112 Karpen Building, Chicago; 3d Tuesday of each month, except June, July and August, Karpen Building, Chicago.
- WESTERN SOCIETY OF ENGINEERS.**—J. H. Warder, 1735 Monadnock Block, Chicago; regular meeting 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

Traffic News

The annual convention of the American Association of Freight Agents was held at Houston, Tex., on April 21 to 24.

The Canadian Pacific proposes, beginning June 11, to run one of its fast steamships between Vancouver and Manila, by way of Japanese ports, and to make the trip in 17 days.

The Zanesville (Ohio) Merchants' Association has adopted resolutions favoring a 5 per cent. increase in freight rates on the eastern roads. The Sedalia, Mo., Boosters' Club has adopted similar resolutions.

The Upper Mississippi River Cities Traffic Association has filed a complaint with the Interstate Commerce Commission against a proposed advance in freight rates between points in Illinois and points on the west bank of the Mississippi river in Iowa.

The principal railroads of Georgia are to resume the use of interchangeable mileage books on or about May 1. The Supreme Court of the United States has sustained the right of the Georgia Railroad Commission in the matter of its order regulating mileage tickets.

The Erie has announced that a new steel tug, the "Alice Stafford," will be placed in service at once on the Chicago river, in connection with a similar boat already in service to deliver freight on steel floats to and from the Erie terminal and other points, avoiding switching through the congested district.

All of the principal railways of the country have filed with the Interstate Commerce Commission at Washington, new pas-

the cost of marketing their products, but manufacturers have for several years felt the increase in the cost of production, and they recognize a similar increase has been felt by the railroads.

The twenty-third annual convention of the Freight Claim Association will be held at the Hotel Galvez, Galveston, Tex., on May 13. Among the principal topics to be discussed at the convention will be, stray freight, billing methods, loss and damage claims, defective equipment, coal claims, delivery methods, disposition of refused and unclaimed freight, explosives and dangerous freight and its disposition, grain leakage, individual responsibility, inspection of cars, loading methods, live stock, marking freight, packing freight, perishable freight rules, prevention of claims, publication of appeal decisions, stamping package freight.

A meeting of the National Industrial Traffic League is being held at Cleveland, Ohio, this week. Among the reports being considered are those on car demurrage and storage; on freight claims; on bills of lading and on classification. There will be reports also from the committee on transportation instrumentalities, on the need of national legislation and several other topics. One of the principal subjects to be brought before the league is a tentative report formulated by the committee on weighing of the league, and a sub-committee of the committee on relations between railways of the American Railway Association, on a proposed set of rules to govern the weighing of carload freight in accordance with the decision of the Interstate Commerce Commission.

Car Location

The accompanying table, which was taken from bulletin No. 16-A of the American Railway Association, gives a summary of freight car location by groups on March 15, 1914.

CAR LOCATION ON MARCH 15, 1914												
	New England.	N.Y., N.J., Del., Md., Eastern Pa.	Ohio, Mich., Western Pa.	Ind., W. Va., No. & So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn., Dakotas.	Mont., Wyo., Neb., Mo., Ark.	Kans., Colo., Okla., Mex.	Texas, La., New Mexico.	Oregon, Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Total Cars Owned.....	88,533	692,684	284,309	209,641	175,519	493,049	19,842	157,306	33,813	138,901	152,203	2,445,800
Home Cars on Home Roads.....	49,535	423,243	118,181	130,605	100,060	334,976	8,828	102,529	19,483	82,534	100,285	1,470,259
Home Cars on Foreign Roads.....	38,998	269,441	166,128	79,036	75,459	158,073	11,014	54,777	14,330	56,367	51,918	975,541
Foreign Cars on Home Roads.....	50,638	258,780	196,937	82,022	63,942	155,212	10,703	58,732	23,933	45,948	31,841	978,688
Total Cars on Line.....	100,173	682,023	315,118	212,627	164,002	490,188	19,531	161,261	43,416	128,482	132,126	2,448,947
Excess or Deficiency.....	11,640	*10,661	30,809	2,986	*11,517	*2,861	*311	3,955	9,603	*10,419	*20,077	3,147
Surplus.....	1,400	13,415	11,566	14,200	9,835	19,030	3,192	11,554	5,114	24,646	18,058	132,010
Shortage.....	1,183	2,160	1,386	980	465	354	...	125	...	7	485	7,145
Shop Cars—												
Home Cars in Home Shops.....	5,666	51,976	20,385	14,911	12,390	32,551	998	13,366	3,006	7,285	7,063	169,597
Foreign Cars in Home Shops.....	1,311	6,692	9,295	1,711	1,265	4,338	541	1,878	1,108	3,051	313	31,503
Total Cars in Shops.....	6,977	58,668	29,680	16,622	13,655	36,889	1,539	15,244	4,114	10,336	7,376	201,100
Per Cent. to Total Cars Owned—												
Home Cars on Home Roads.....	55.95	61.10	41.57	62.30	57.01	67.94	44.49	65.18	57.62	59.42	65.89	60.11
Total Cars on Line.....	110.62	98.46	110.74	101.42	93.44	99.42	98.43	101.25	128.40	92.50	86.81	100.13
Home Cars in Home Shops.....	6.40	7.50	7.17	7.11	7.06	6.64	5.03	8.50	8.89	5.24	4.64	6.93
Foreign Cars in Home Shops.....	1.25	.97	3.27	.82	.72	.89	2.73	1.08	3.28	2.20	.21	1.29
Total Cars in Shops.....	7.65	8.47	10.44	7.93	7.78	7.53	7.76	9.58	12.17	7.44	4.85	8.22

*Denotes deficiency.

senger tariffs showing rates made in compliance with the order of the Interstate Commerce Commission requiring very strict adherence to the long and short haul provision of the law. There are many reductions and many increases, but apparently nearly or quite all of the changes are small.

During the past week the Chicago & North Western, in co-operation with the Agricultural College of the University of Wisconsin, has operated in Wisconsin a special educational train in the interest of potato-growing. The train was run through the leading potato growing counties of the state, making stops at the more important centers, and lectures and demonstrations were given at each place on soil preparation, planting of the seeds, cultivation of crops and fertilizing. One car in the train was devoted to exhibits.

The American Blower Company, Detroit, Mich., has sent to the Interstate Commerce Commission a letter favoring the five per cent. increase in freight rates asked for by the eastern railroads. All of this company's plants ship over the eastern railroads. The letter says that manufacturers in that line would be among the first to oppose any material increase in

"Without Cost to the Government"

Following favorable discussion of a resolution introduced in the Senate at Washington by Mr. Weeks, of Massachusetts, the committee on naval affairs has introduced a bill to establish one or more lines of vessels, of the navy, to carry mail between the Atlantic coast of this country and ports on the western coast of South America, after the opening of the Panama Canal. The Secretary of the Navy, in a report to the Senate, endorses the idea of using fast navy cruisers to carry passengers, mail and freight on the route indicated. Secretary Daniels says:

"The following vessels will be available for the service: St. Louis, Charleston, Milwaukee, Columbia, Minneapolis, fast cruisers; Salem and Chester, fast scout cruisers; Buffalo and Rainbow, transports; Ancon, Cristobal and Hector, Panama steamers; Mars, Vulcan, Cyclops and Neptune (or two equally good), and the Nanshan, colliers.

"The department sees in the plan an opportunity for a two-fold advantage. First, the opportunity for developing a large trade with South America, which is not practicable

for private vessels under the United States flag. Second, the gradual development of a large auxiliary fleet, which would be necessary in time of war, which would be built up and maintained in time of peace without cost to the government, as it will pay for itself after having once been firmly established."

Car Balance and Performance

Arthur Hale, chairman of the committee on relations between railroads, of the American Railway Association, in presenting statistical bulletin No. 166, covering car balances and performances for December, 1913, says:

The committee presents herewith statistical bulletin No. 166, covering car balance and performance for December, 1913.

The miles per car per day were 23.5, compared with 25.7 for November. This figure for December, 1912, was 24.4.

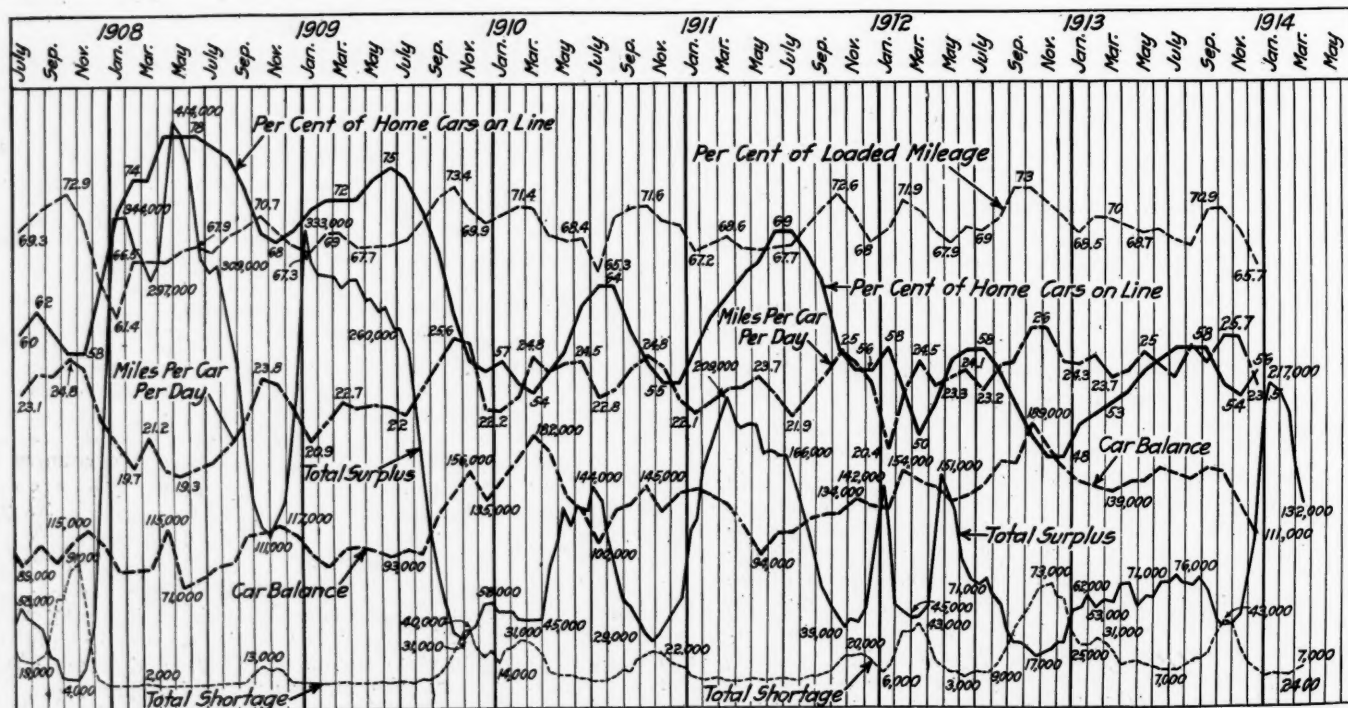
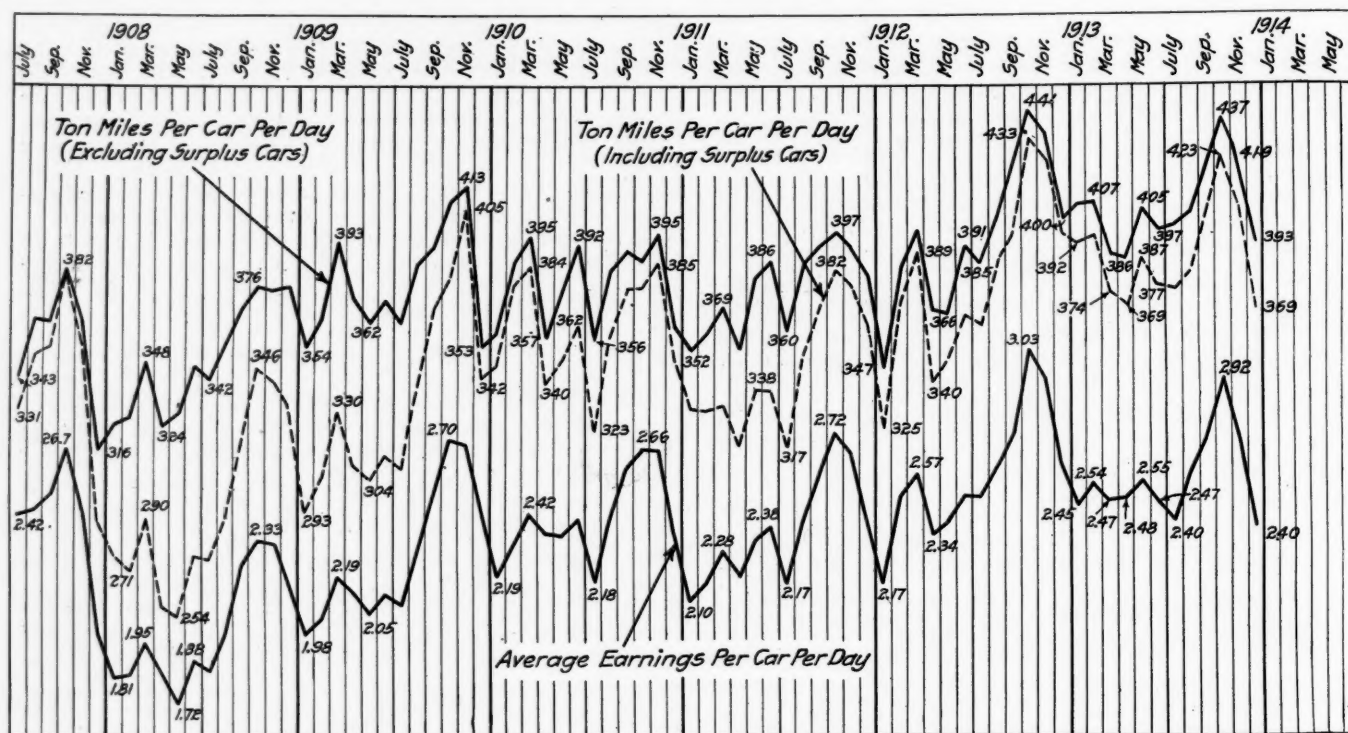
Ton miles per car per day for December were 369, compared with 405 for November. This is a decrease of 6.82 per cent., compared with the figure for December, 1912, which was 396.

The proportion of home cars on line was 56 per cent., compared with 54 per cent. in November. This is an increase of 8 points over December, 1912.

The per cent. of loaded car mileage decreased from 69.0 per cent. in November to 65.7 per cent. in December. This figure for December, 1912, was 70.3 per cent.

The average earnings per car per day increased 32 cents to \$2.40 in December, 1913. This figure for December, 1912, was \$2.61.

The table on the following page gives car balance and performance in the month covered by the report, and the diagram shows car earnings and car mileage, and different car performance figures monthly from July, 1907.



Freight Car Mileage, Earnings and Performance, 1907 to 1914

CAR BALANCE AND PERFORMANCE IN DECEMBER, 1913

	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kan., Colo., Ark., Mo., Okla.	Texas, La., New Mex.	Ore., Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Revenue freight cars owned.....	89,205	206,118	191,079	168,353	452,979	19,677	145,278	29,600	143,861	150,537	2,300,162
Average number of system cars on line.....	43,417	121,015	101,296	83,930	313,309	6,757	71,248	18,735	74,117	98,537	1,300,040
Railway-owned cars: Average foreign on line.....	50,007	105,539	82,646	68,979	137,561	11,442	71,222	30,445	44,396	34,510	932,911
Total Railway-owned cars on line.....	93,424	226,554	183,942	152,909	450,870	18,199	142,470	49,180	118,513	133,047	2,232,951
Excess.....	4,219	20,436	*7,137	*15,444	*2,109	*1,478	*2,808	19,580	*25,348	*17,490	*67,211
Per cent. of cars on line to total owned:											
Home.....	49	59	53	50	69	34	49	63	51	65	56
Foreign.....	56	51	43	41	30	58	45	103	31	23	41
All railways.....	105	94	96	91	99	92	94	166	82	88	97
Private cars on line.....	3,515	9,087	6,347	9,714	16,803	2,281	9,340	4,194	9,746	2,644	105,916
Total all cars on line.....	96,939	235,641	190,289	162,623	467,673	20,480	151,810	53,374	128,259	135,691	2,338,867
Per cent. of cars in shop.....	6.52	11.89	7.36	7.35	5.15	5.28	7.96	6.29	5.37	5.50	6.92
No. of freight engines owned.....	1,438	3,092	3,646	2,773	7,358	498	2,901	858	2,875	2,308	38,615
Average cars on line per freight engine owned.....	67	76	52	59	64	41	52	62	45	59	61
Total freight-car mileage.....	56,280,605	133,344,932	143,904,476	129,064,812	310,188,943	26,056,842	91,429,189	33,190,797	107,557,198	108,617,911	1,662,113,287
Average miles per car per day.....	20.4	19.5	24.4	25.7	22.3	11.0	20.3	20.6	27.0	25.8	23.5
Per cent. loaded mileage.....	69.8	64.6	64.6	66.7	67.5	41.2	68.5	67.5	70.2	71.6	65.7
Ton-miles of freight, including company freight.....	671,749,145	8,578,211,428	2,220,703,392	3,785,885,569	420,189,359	1,184,810,005	401,736,023	1,551,316,381	1,860,851,517	24,952,886,193	
Average ton-miles, including company freight:											
Per car-mile.....	11.9	16.4	16.4	14.9	15.1	16.1	15.3	12.4	14.7	17.1	15.7
Per loaded car-mile.....	17.1	25.1	25.4	22.3	22.4	22.6	22.3	18.3	20.9	23.9	23.9
Per car per day.....	243	398	401	383	337	662	311	255	395	442	369
Gross freight earnings.....	\$6,887,761	\$47,729,328	\$14,227,017	\$13,021,658	\$32,591,093	\$2,919,674	\$11,677,993	\$4,038,081	\$16,598,146	\$11,629,897	\$173,480,804
Average daily earnings: Per car owned.....	\$2.49	\$1.90	\$2.41	\$2.49	\$2.32	\$4.79	\$2.51	\$4.40	\$3.74	\$2.49	\$2.43
Per railroad car on line.....	2.38	1.73	2.50	2.75	2.33	5.18	2.68	2.65	4.54	2.82	2.51
All cars on line.....	2.29	1.66	2.41	2.58	2.25	4.60	2.52	2.44	4.19	2.76	2.40

*Denotes deficiency.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission has suspended from April 21 to August 19 an item in a Chicago, Burlington & Quincy tariff canceling the absorption of ferry charges on traffic handled between Nauvoo, Ill., and Montrose, Ia., destined to points on the Chicago, Burlington & Quincy and connections.

The commission has suspended from April 20 to August 18 a note to a rule in an Atchison, Topeka & Santa Fe tariff whereby the reconsignment rules on less than carload freight are made not to apply on interstate business west of Albuquerque and Belen, N. M., or on California interstate traffic.

The commission has suspended to August 21 certain schedules in tariffs of the Boston & Albany, the Delaware & Hudson, the Delaware, Lackawanna & Western, the Erie, the Lehigh Valley, the Pennsylvania Railroad, the New York Central & Hudson River, etc., increasing the rates on knit goods in any quantity from eastern points to Chicago, St. Louis and certain other western points.

Conference Ruling

In re applications by railroads owning water carriers.

The commission holds that a railroad having ownership in a competing common carrier by water may continue such ownership after July 1 until the commission has passed upon the application relative thereto, provided such application has been filed before July 1. In its opinion it is not conceivable that congress intended that the service should be withdrawn from the public on July 1, if for sufficient reasons it had been impossible for the commission to determine the questions presented in the application before that date.

Shipment Not Misrouted

C. S. Brackett Company v. Great Northern Express. Opinion by the commission:

The commission finds that the carrier did not misroute a shipment of liquor in glass by following the directions on the box rather than those on the receipt, both of these addresses having been filled in by the shipper and the discrepancy not noticed by the carrier's agent when he received the goods. (29 I. C. C., 667.)

Rates Dependent on Number of Cars Unlawful

Woodward-Bennett Company v. San Pedro, Los Angeles & Salt Lake. Opinion by the commission:

Defendant at the time the shipments involved in this case were made maintained four rates on cattle in carloads depending upon the number of cars shipped. Complainant, having ordered 11 cars, was furnished 7 at one time and the remainder later, and hence had to make two shipments at the rate for less than 8 cars. The commission finds that the charges collected on that basis were in accordance with the published tariffs and reasonable, but it holds unlawful the present rules of defendant whereby different rates are charged for shipments of 20 cars or less than for more than 20. (29 I. C. C., 664.)

Road Stone Rates to Points in Eastern Maryland

In re rates for interstate transportation of crushed stone from Port Deposit, Md., and from points in other states to points in Maryland and Delaware. Opinion by the commission:

The commission finds that the carriers have not justified certain proposed increases in the rates on crushed stone from Port Deposit, Md., and producing points in other states to consuming points in Maryland and Delaware. These rates were reduced on the request of the state of Maryland, which is carrying on a large amount of road building in the part of Maryland to the south of Delaware. The rates yield revenue which compares favorably with that received for similar service in other sections. (30 I. C. C., 22.)

Projectile Rates Found Reasonable

United States of America v. Richmond, Fredericksburg & Potomac et al. Opinion by Commissioner Clements:

The commission finds reasonable an item in the current southern classification reading as follows: "Projectiles, empty or solid, other than small arm, in boxes, 1. c. 1., first class. In packages or loose, c. 1., minimum weight 30,000 lb., fourth class." (29 I. C. C., 702.)

Classification of Cement Silo Staves

H. E. Wallingford v. Atchison, Topeka & Santa Fe et al. Opinion by the commission:

The commission finds that a class D rating on cement silo staves in car loads from Kansas City to points in Kansas, Colorado and Oklahoma is unreasonable. It is prescribed that in the future these shipments should move under the class E rating on cement building blocks and various articles of artificial stone. Reparation is awarded for certain shipments made after June 30, 1913, on which date the class D rating was put into effect. (30 I. C. C., 19.)

Cancellation of Through Route Unwarranted

Wichita Business Association v. Kansas City, Mexico & Orient, et al. Opinion by the commission:

The commission finds that the carriers should re-establish the joint rates on cattle in carloads to Wichita, Kan., from points in Texas and Oklahoma via the lines of the Wichita Falls route to Altus, Tex., and the Kansas City, Mexico & Orient beyond. The cancellation of these rates because of a disagreement as to divisions is termed unwarranted. (29 I. C. C., 669.)

Indian Creek Valley Coal Rates

Rogers & Prinkey v. Baltimore & Ohio et al. Opinion by Commissioner Harlan:

The commission finds reasonable a proposed adjustment whereby the rates on coal from mines on the line of the Indian Creek Valley will be 10 cents per ton higher than from mines in the adjacent Meyersdale group on the Baltimore & Ohio. (30 I. C. C., 32.)

Rates on Coal to Morton Grove, Ill.

Poehlman Brothers Company v. Chicago, Milwaukee & St. Paul. Opinion by Commissioner Clark:

The commission finds that defendant's rate of 40 cents per ton applicable from Galewood, Ill., an interchange point in the Chicago switching district, to Morton Grove, Ill., on interstate shipments of coal received from connecting lines at the former point is not unduly discriminatory. The commission declines to express an opinion as to the reasonableness of the rate in question, because although the latter applies on through traffic the participating carriers have not been made defendants and the through rate has not been drawn in question. (30 I. C. C., 89.)

Memphis Wheat Rates

In re wheat rates from Oklahoma points to Memphis, Tenn., and other points. Opinion by the commission:

The commission finds that the carriers have not justified certain proposed changes approximating two and one-half cents per 100 lb. in the rates on wheat and grain products taking the same rates from points in Oklahoma west of Oklahoma City to Memphis, Tenn., and points taking the same rates. The present rates have been in effect for five years, and comparisons show that they are not unreasonably low. (30 I. C. C., 93.)

Metropolis, Ill., as a Lumber Market Discriminated Against

Metropolis Commercial Club v. Illinois Central et al. Opinion by Commissioner Clark:

The commission finds that the maintenance of higher rates on lumber and logs to Metropolis, Ill., from equi-distant points in Tennessee, Alabama, Mississippi, Louisiana and that part of Arkansas on and south of the line of the Chicago, Rock Island & Pacific between Memphis, Tenn., and Little Rock, Ark., than

are contemporaneously in-effect to Cairo, Ill., subjects shippers and manufacturers at Metropolis to undue disadvantage. It is therefore ordered that from points in the territory described east of the Mississippi river, the rates to Metropolis should not exceed those to Cairo and that from points west of the Mississippi the rates to Metropolis should not exceed those to Cairo by more than one cent per 100 lb. It is also held that the charges of the Illinois Central from Paducah, Ky., to Metropolis applied as parts of the through charges on logs to be milled in transit at Metropolis should not exceed the charges for similar transportation of logs to be milled at Cairo from East Cairo, Ky., to Cairo, Ill. (30 I. C. C., 40.)

STATE COMMISSIONS

The Indiana Public Service Commission has issued an order reducing certain freight rates on coal from the Brazil and Linton districts from 70 to 65 cents a ton.

The California Railroad Commission has rendered a decision denying the application of the Southern Pacific for authority to continue passenger fares from any point to any other point in the state lower than the fares to intermediate points. The application was made for relief from the long and short haul clause in the state constitution.

The Central Illinois Creamery Men's Club has protested to the Illinois Public Utilities Commission that the Illinois Central, the Wabash, the Chicago & Eastern Illinois, the Baltimore & Ohio Southwestern and the Chicago & Alton are furnishing inadequate service for the transportation of dairy products from points in the southern part of the state to Chicago.

After a conference between representatives of commercial houses, a traveling men's association and the railroads, the Missouri Public Service Commission has issued an order authorizing the issuance and sale, at face value, of excess baggage coupon books by the railroads of the state. Baggage coupon books were discontinued by the roads when the two-cent fare law became effective.

The New York State Public Service Commission for the First District has approved a new tariff filed by the Westcott Express Company, making certain reductions in taxicab rates in New York City from the New York Central, the West Shore and the Lackawanna terminals. Under the new tariff three new zones are established within the boundaries of three old zones. The fare to any point in the new zones will be 60 cents, but to the extremities of the old zones it will be 75 cents, as formerly. The rate is for one or two persons, but for greater numbers reductions are also made. The rate for hourly service is also reduced from \$2.50 to \$2 an hour.

The city of Chicago, through its corporation counsel, has announced its intention of contesting the constitutionality of the act creating the Illinois Public Utilities Commission. The city was made a party to a case before the commission involving street car fares between the city and a suburb. The answer filed by the city claims that the act of the legislature creating the commission is violative of the constitution of the United States, and of the constitution of the state of Illinois, and that the act is therefore unconstitutional and void. The city administration has opposed the act creating the commission, because it did not provide for home rule for Chicago in the matter of public utility regulation.

Local aspects of the industrial railways case were brought before the Ohio Public Utilities Commission at Columbus on April 16, when 30 industrial lines in the state appealed to the commission to suspend the cancellation of joint rates and allowances by the trunk lines. One of the roads affected is the Newburgh & South Shore. Eleven Cleveland shippers located on this line have applied to the Cuyahoga county court to restrain the cancellation of allowances to this line on the ground that it will require them unjustly to pay switching charges, which have heretofore been absorbed. This, they claim, would be a discrimination against them in favor of shippers who are not dependent on this line.

PERSONNEL OF COMMISSIONS

J. H. Prior, engineer of design of the Chicago, Milwaukee & St. Paul at Chicago, has been appointed assistant chief engineer of the Illinois Public Utilities Commission, with office at Springfield, Ill.

Frank O. Dufour, formerly professor of bridge engineering at the University of Illinois, has been appointed senior structural engineer of the division of valuation, Interstate Commerce Commission, for the central district, with office at Chicago.

Milan V. Ayres has been appointed senior electrical engineer for the Eastern District, Division of Valuation, Interstate Commerce Commission, with office in Washington, D. C. Mr. Ayres was born at Hamlin, Kan., February 14, 1875. He graduated from the electric department of the Massachusetts Institute of Technology in 1898, and entered the service of the General Electric Co. at Schenectady, N. Y., being employed in the testing department and later in design of alternating current machinery. In 1902 he became electrical and mechanical engineer for the Boston & Worcester Street Railway Company, continuing in this position until July, 1911, when he went to Nyack, N. Y. In November, 1911, he became chief engineer of the Mobile Light and Railroad Company, Mobile, Ala. In 1912 he resigned to take a position with Ford, Bacon & Davis, consulting engineers, New York City, in which position he continued until his recent appointment with the Interstate Commerce Commission. While in Massachusetts, Mr. Ayres took up the study of law and was admitted to the bar in 1909. Mr. Ayres was for a time a member of the executive committee of the New England Railroad Club, and also a member of the executive committee of the Boston Section of the American Institute of Electric Engineers.

Fred W. Ranno, has been appointed senior civil engineer, for service in the Eastern District, Division of Valuation, Interstate Commerce Commission, with office in Washington, D. C. Mr. Ranno was born at Washington, Vt., and graduated from the Massachusetts Institute of Technology in 1889. His first experience was with the Pennsylvania Lines where he was employed immediately after graduation as a member of the engineering corps. After a few months he went to the Lake Shore & Michigan Southern and was soon promoted to resident engineer in charge of new construction in and around Chicago. In October, 1897, he entered the service of the Southern Indiana Railway (now Chicago, Terre Haute & Southeastern) as assistant engineer. He was promoted to engineer of Maintenance of Way in 1900 and took charge of the construction of over 50 miles of branch lines. From October, 1905, to February, 1907, he was engaged in manufacturing at Manchester, N. H., and then for four years was assistant engineer on the Union Pacific. From April, 1911, to January, 1913, he was principal assistant engineer on the Missouri, Oklahoma & Gulf. From January, 1913, to his recent appointment by the government he was superintendent for Kilpatrick Brothers, contractors for the Wichita Union Terminal Railway, Wichita, Kansas.

COURT NEWS

The federal court at Detroit, Mich., on April 15, declined to pass upon a petition of the Pere Marquette for permission to refuse to carry United States mails under its present contract.

IMPROVED TRANSPORTATION FACILITIES IN INDIAN CITY.—Representatives of the London General Omnibus Company of London have recently organized the General Omnibus & Transport Company of Calcutta to do a general merchandise and passenger carrying business in that city. The new company will have a capital of \$2,500,000, most of which will be taken up in England. It expects to put in service within a year 100 motor busses and 400 motor trucks. The former will supplement a street railway system which has been giving very unsatisfactory service. They will be single deck vehicles and of three types—first, second and third class. The motor trucks will supplant the present native ox carts. The latter are exceedingly slow and because of physical and legal limitations can only carry a small load. The motor trucks should therefore prove a great benefit to both the shippers and the railroads. The present congestion around the railroad and shipping terminals will be greatly relieved.

Railway Officers

Executive, Financial, Legal and Accounting

L. R. Wood has been appointed assistant auditor of the Oregon Short Line, with headquarters at Salt Lake City, Utah.

J. I. Ferguson, general baggage agent of the Indianapolis Union, has been appointed assistant paymaster, with office at Indianapolis, Ind.

Walter V. Wilson has been appointed assistant general auditor of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago.

J. M. Tomlinson, general auditor of the New York, New Haven & Hartford, has been appointed vice-president, with headquarters at New Haven, Conn.

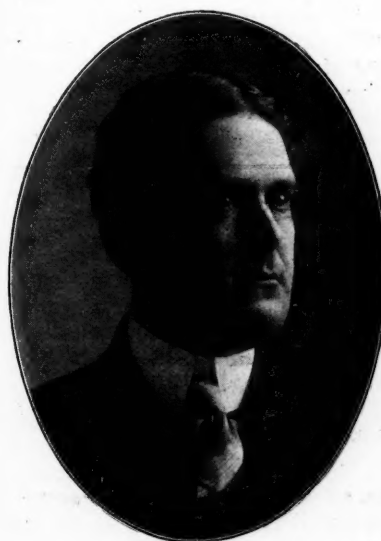
C. W. Nelson, assistant to president of the St. Louis Southwestern at St. Louis, Mo., has been elected vice-president, with headquarters at St. Louis. A portrait of Mr. Nelson and a sketch of his railway career were published in the *Railway Age Gazette* of October 17, 1913, page 723.

Eppa Hunton, Jr., has been elected general counsel of the Richmond, Fredericksburg & Potomac and the Washington Southern, succeeding A. C. Braxton, deceased. Mr. Hunton is a member of the firm of Munford, Hunton, Williams & Anderson, of Richmond, Va.

Alfred Mackrille, who has been appointed assistant general auditor of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., as has been announced in these columns, was born on March 31, 1868, at Halifax, England. He was educated in the common schools and later attended the Y. M. C. A. classes. On July 20, 1881, he began railway work in the auditor's office of the New England Railroad as office boy and clerk and in August, 1887, was appointed clerk in the comptroller's office of its successor, the New York, New Haven & Hartford. He was appointed traveling auditor in June, 1893, and about ten years later was appointed chief traveling auditor; on June 1, 1907, he was appointed auditor of freight receipts, which position he held at the time of his recent appointment as assistant general auditor of the same road, as above noted.

William Alfred Winburn, who has been elected president of the Central of Georgia, with headquarters at Savannah, Ga., as has been announced in these columns, was born on October 19,

1863, at Gainesville, Ga., and began railway work in 1880, as a clerk in the freight house of the Richmond & Danville at Gainesville. He was subsequently clerk in the office of the assistant general freight agent of the same road until June, 1883; then for three years clerk in the office of the assistant general freight and passenger agent of the Western North Carolina, now part of the Southern Railway, and in June, 1886, left that road to return to the service of the Richmond & Danville in the same capacity. In September, 1887, he was appointed division freight and passenger agent of the same road, and then from January to April, 1892, was clerk in the general manager's office of the Columbus Southern, now a part of the Seaboard Air Line. From April, to June, 1892, he was clerk in the traffic manager's office of the Central Railroad & Banking Company of Georgia, at Savannah,



W. A. Winburn

W. A. Winburn, who has been elected president of the Central of Georgia, with headquarters at Savannah, Ga., as has been announced in these columns, was born on October 19,

Ga., and then to October, 1901, was general freight agent of the Central of Georgia. On October 1, 1901, he was promoted to traffic manager and from July, 1902, to July, 1904, was vice-president and traffic manager of the same road. He was then elected second vice-president, and from October, 1908, to December, 1910, was vice-president in charge of traffic, and since that time was vice-president in charge of traffic and operation, which position he held at the time of his recent election as president of the same road, as above noted.

Operating

F. H. Dowler has been appointed general agent and superintendent of terminals of the Nashville, Chattanooga & St. Louis, with headquarters at Chattanooga, Tenn. He was born in 1866, and began railway work in 1879 as night operator on the East Tennessee, Virginia & Georgia, now a part of the Southern Railway. Shortly afterwards, he became record clerk and operator at Bristol, and later at Chattanooga. He was subsequently chief clerk on the Cincinnati Southern, and later on the Alabama Great Southern. In 1888 he entered the service of the Nashville, Chattanooga & St. Louis as chief clerk; ten years later he was appointed agent at Chattanooga, and now becomes general agent and superintendent of terminals of the same road, as above noted.

William Carswell, whose appointment as superintendent of the Great Northern, with office at Marcus, Wash., has already been announced in these columns, was born October 17, 1865, at Rutland, Vt. He received a common school education and entered train service in April, 1886, as brakeman on the Union Pacific. From July, 1888, to May, 1894, he was with the Southern Pacific successively as brakeman, freight conductor and passenger conductor, and from June, 1894, to November, 1899, was brakeman and conductor on the Oregon Short Line. He then went to the Great Northern, where he was employed as conductor, terminal agent, and yardmaster, until July, 1907, when he was promoted to trainmaster. In November of that year he was made assistant superintendent, which position he held until April 1, when he was appointed superintendent, as above noted.

Theodore Speiden, Jr., who has been appointed assistant superintendent of the Chattanooga division of the Nashville, Chattanooga & St. Louis, with headquarters at Nashville, Tenn., as has been announced in these columns, was born on March 25, 1881, at Louisville, Ky., and graduated in 1899 from the Louisville High School. In May of the same year he entered the service of the Louisville & Nashville as rodman on maintenance of way work, and from 1900 to 1901 was rodman and masonry inspector on construction work. He was then assistant engineer until his appointment as roadmaster of the Nashville division in 1905, which position he held at the time of his recent appointment as assistant superintendent of the Nashville, Chattanooga & St. Louis. From 1912 to 1914, in addition to his duties as roadmaster, he was manager of construction in charge of revision of line and second track work on a 13-mile section at the southern end of the Nashville-Decatur division. Mr. Speiden's entire service until his recent appointment has been with the Louisville & Nashville.

Henry E. Hutchens, whose appointment as superintendent of passenger transportation of the Southern Railway, with headquarters at Washington, D. C., has been announced in these columns, was born in Butts county, Ga., and was educated at Union Point Academy. He began railway work in 1872, as telegraph operator on the Georgia Railroad. He was subsequently telegraph operator and freight clerk on the Atlantic & Gulf; he then returned to the service of the Georgia Railroad in the same capacity. From 1876 to 1882 he was telegraph operator for the Western Union Telegraph Company. He was then to March, 1896, successively telegraph operator, freight clerk, ticket agent, yardmaster, agent, chief clerk traffic department, assistant master of transportation and master of transportation of the Savannah, Florida & Western, now a part of the Atlantic Coast Line. He was then for one year yardmaster of the Central of Georgia and from March, 1897, to September, 1899, was assistant superintendent and superintendent of the Atlantic & Danville. In September, 1899, he was appointed superintendent of the Norfolk division of the Southern Railway at Norfolk, Va. On January 1, 1901, he was appointed superintendent of the

Memphis division of the same road and the Northern Alabama. From 1907 to 1910 he was successively general superintendent of the Eastern and Southern districts, and since March 12, 1910, was general superintendent of the Northern district of the same road, which position he held at the time of his recent appointment as superintendent of passenger transportation, as above noted.

Traffic

S. M. Dickey has been appointed commercial agent of the St. Louis Southwestern at Pine Bluff, Ark.

F. G. Adams has been appointed commercial agent of the Grand Trunk, with office at Winnipeg, Man., succeeding W. J. Hunter, deceased.

J. Carroll Hughes has been appointed soliciting freight agent of the Georgia Southern & Florida, with office at Macon, Ga., succeeding Charles G. Norris, assigned to other duties.

Vivian G. Snell has been appointed commercial agent of the Grand Trunk, with office at Moncton, N. B., succeeding W. J. P. McGregor, who has accepted service with the Grand Trunk Pacific.

W. G. Womble, division freight agent of the Norfolk Southern, with office at Raleigh, N. C., has resigned to accept a position with the Corporation Commission of North Carolina.

Frank M. Byrd, chief clerk in the office of superintendent of the Indianapolis Union, has been appointed general baggage agent, with office at Indianapolis, Ind., succeeding J. I. Ferguson, promoted.

Fred Wild, Jr., general freight agent of the Denver & Rio Grande, at Denver, Colo., has been appointed freight traffic manager, with office at Denver, succeeding H. M. Adams, and W. M. Lampton, assistant general freight agent at Denver, has been appointed general freight agent, effective May 1.

J. E. Fitzwilson, New England agent of the Southern Railway at Boston, Mass., has been appointed general agent, with office at New York City, succeeding W. C. Harrison, transferred, and J. A. Werne, commercial agent at Pittsburgh, Pa., succeeds Mr. Fitzwilson. Samuel M. Howard has been appointed freight soliciting agent, with office at Greenville, S. C.

J. H. Martin has been appointed traveling freight agent of the Central of Georgia, with headquarters at Macon, Ga., succeeding W. B. Morgan, promoted. W. H. Bremer has been appointed traveling freight agent, with headquarters at Cincinnati, Ohio, succeeding A. Daniels, resigned, and J. S. Hickey has been appointed traveling freight agent, with headquarters at Chicago, succeeding G. M. Rowell, promoted.

Engineering and Rolling Stock

J. A. Rutledge has been appointed roadmaster of the Detroit, Toledo & Ironton at Napoleon, Ohio, in place of P. O'Brien, resigned.

L. C. Ord has been appointed assistant master car builder of the Canadian Pacific, Eastern lines, with office at Montreal, Que., succeeding P. A. Crysler, assigned to other duties.

I. F. White, division engineer of the Cincinnati, Hamilton & Dayton at Dayton, Ohio, has been appointed engineer maintenance of way of the Chicago Great Western, with headquarters at Chicago, succeeding C. G. Delo, promoted.

E. A. Frink, bridge engineer of the Seaboard Air Line at Norfolk, Va., has been appointed principal assistant engineer, succeeding E. C. Bagwell, promoted; L. Chevalier succeeds Mr. Frink, and W. L. Darden has been appointed engineer of buildings.

J. W. G. Brewer, assistant district superintendent of motive power of the Baltimore & Ohio, at Baltimore, Md., has resigned, and C. A. Gill, general master mechanic, succeeds Mr. Brewer. Henry Gardner has been appointed assistant superintendent of shops at Mount Clare, Baltimore.

J. R. Holman, chief engineer of the Oregon-Washington Railroad & Navigation Company at Seattle, Wash., will on May 1 be transferred to Portland, Ore., where he will assume

the duties performed by George W. Boschke, chief engineer, who resigns to engage in private business.

H. K. Lowry, principal assistant signal engineer of the Chicago, Rock Island, & Pacific, has been appointed signal engineer, with headquarters at Chicago, succeeding A. G.



Photo by Matzene, Chicago.

H. K. Lowry

Shaver, who has resigned to become secretary and treasurer of the Hollett Iron Works, Chicago. Mr. Lowry was graduated from the Massachusetts Institute of Technology in 1904, as an electrical engineer. During his summer vacations while attending school he worked in the signal department of the Chicago, Milwaukee & St. Paul, re-entering the service of that road after graduating. He was first employed as laborer on mechanical interlocking construction; in 1905 was transferred to the drafting department, and in the fall of that year was appointed signal inspector. In December, 1908, he was promoted to assistant signal engineer, which position he held until June, 1912. He went to the Chicago, Rock Island & Pacific in July, 1912, as superintendent of construction, and was appointed assistant signal engineer in January, 1913. In August of that year, when the signal department was reorganized, Mr. Lowry became principal assistant engineer, which position he held at the time of his recent appointment as signal engineer, as above noted.

Purchasing

E. J. Roth, assistant general storekeeper of the Chicago, Burlington & Quincy at Chicago, has been appointed supply agent of the Chicago, Indianapolis & Louisville, with headquarters at Lafayette, Ind.

G. W. Hayden has been appointed assistant to the chief purchasing officer of the St. Louis & San Francisco, with headquarters at St. Louis, Mo. T. J. Powell has resigned as purchasing agent to become manager of the railway sales department of the Pierce Oil Corporation, and the former office is abolished.

Special

Luis Jackson, industrial development commissioner of the Erie, has resigned, the resignation to take effect April 30. Mr. Jackson was born in Liverpool, England, in 1856, and served an apprenticeship in the freight business there. His first work in America was as car loading clerk at packing houses in Chicago. Subsequently he did special traffic work for the Burlington road. As a specialist in industrial development he was a pioneer, having established on the Chicago, Milwaukee & St. Paul, in 1891, the first American industrial development department. He found places for factories, fostered the opening of mines and the utilization of water powers, and aided in the development of timber districts. He remained in the service of the St. Paul road for thirteen years, and went from there to the Erie, where he organized a department for increasing manufacturing development along the company's lines. Mr. Jackson has educated the public by writing for the magazines, and has lectured to students of several universities.

OBITUARY

Warder Cummings, formerly from 1881 to 1886 general superintendent of the Texas & Pacific at Marshall, Tex., and recently terminal agent at Denison, Tex., died at his home in the latter city on April 9, aged 75 years.

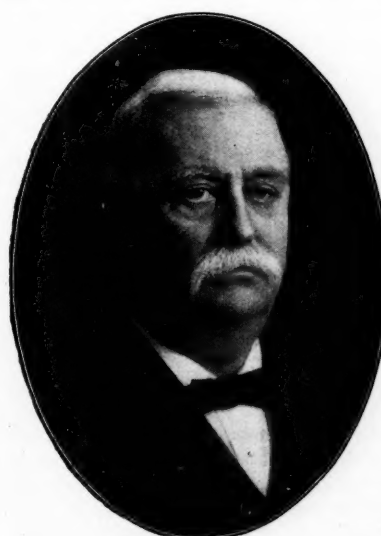
C. G. Phillips, president of the Cropley-Phillips Company, of Chicago, and secretary of the Association of American Railway Accounting Officers since the organization of that association in 1887, died at his home in Evanston, Ill., April 17.

Aaron J. Zabriskie, a civil engineer and railway builder, died on April 15, at his home in Jersey City, N. J., at the age of 60. He was graduated from the Polytechnic Institute at Albany, N. Y., in 1876, and was later engaged in the construction of the Ninth Avenue elevated line in New York City, which was the first elevated road built in that city, and afterwards was engaged in construction work on the Erie Railroad.

William H. Hosmer, chairman of the Western Trunk Line Committee at Chicago, died in that city on April 21, of pneumonia. He was also chairman of the Illinois Freight Committee, the Gulf Foreign Freight Committee and the Illinois-Indiana Coal Traffic Bureau. He was born in Boston in 1869 and had been continuously in the service of the Western Freight Association, and its successor, the Western Trunk Line Committee, since 1880, having begun as a clerk.

Thomas H. Johnson, formerly consulting engineer of the Pennsylvania Lines West of Pittsburgh, with headquarters at Pittsburgh, Pa., died on April 16, at Pittsburgh. He was born on January 12, 1841, at Coshocton, Ohio, and was educated at Jefferson College in Pennsylvania. He began railway work in 1863 as rodman on the Pittsburgh & Steubenville, now a part of the Pittsburgh, Cincinnati, Chicago & St. Louis. From 1864 to 1865 he was a rodman on the Marietta & Cincinnati and then to 1867 was assistant engineer of the Pana, Springfield & Northwestern, now a part of the Baltimore & Ohio Southwestern. He was appointed assistant engineer of the Pittsburgh, Cincinnati & St. Louis in 1867, remaining in that position until 1875, and during the following three years was in general practice as civil engineer and architect at Columbus, Ohio. From 1878 to 1883 he was engineer for contractors building the Indiana state house and then to January, 1896, was principal assistant engineer of the Pittsburgh, Cincinnati & St. Louis and its successor, the Pittsburgh, Cincinnati, Chicago & St. Louis. He was promoted in January, 1896, to chief engineer of the same road, remaining in that position until January 1, 1901, when he was appointed consulting engineer of the same road and the Pennsylvania Company, comprising the Pennsylvania Lines West of Pittsburgh.

Alfred Noble, formerly for seven years, 1902 to 1909, chief engineer of the East River division of the Pennsylvania Railroad, at New York, and one of the most prominent engineers in



A. Noble

the country, died on April 19, in St. Luke's hospital, New York. He was born on August 7, 1844, at Livonia, Mich., and his early education was received in the district school of his native town. From 1862 to 1865 he served in the army of the Potomac. He then entered the University of Michigan, and was graduated in 1870, with the degree of C. E. He received the degree of LL.D. from his Alma Mater in 1895, also from the University of Wisconsin in 1904. From 1868 to 1870 he was assistant engineer on river and harbor work on the Great Lakes, and then was in charge of

improvements on St. Mary's Falls Canal and St. Mary's river. During this time the first great masonry lock at the Sault, which at the time was the largest canal lock in the world, was built. From 1883 to 1886 he was general assistant engineer of

the Northern Pacific and then to 1894 was resident engineer on the construction of several very large and important bridges—including those over the Mississippi at Memphis and over the Ohio at Cairo. In 1895 he was appointed a member of the Nicaragua Canal Board by President Cleveland and in June, 1899, was appointed by President McKinley, a member of the Isthmian Canal Commission which was charged with the selection of the best canal route across the American Isthmus. In 1905 he was appointed a member of the International Board of Engineers to recommend whether the Panama Canal should be constructed as a sea level or a lock canal. Mr. Noble was one of the minority of five who recommended the adoption of the lock plan and whose views were adopted by the government. In March, 1907, he was one of the three appointed by President Roosevelt to visit the Panama Canal to investigate the conditions regarding the foundations of some of the principal structures. From the very inception of the plan by the United States until the commencing of the actual construction of the Panama Canal, Mr. Noble was continuously identified with the project. In July, 1897, he was appointed a member of the United States Board of Engineers on Deep Water Ways, which made surveys and estimates of cost for a ship canal from the Great Lakes to deep water in the Hudson river. In November, 1901, the city authorities of Galveston, Texas, appointed Mr. Noble and two associates, members of a board of engineers to devise a plan for protecting the city and suburbs from future inundation, and their recommendations were carried out. From 1902 to 1909, Mr. Noble was chief engineer of the East river division of the New York extension of the Pennsylvania Railroad and was in entire charge of this most difficult work, involving as it did, a very accurate survey across Manhattan Island and the construction of the foundations of the Pennsylvania Station, of the land tunnels, and of the East river tunnels, which were very troublesome. Since 1909 he had been engaged in general practice as a consulting engineer in the firm of Noble & Woodard. Probably the most important work Mr. Noble dealt with was in relation to the dry docks built for the United States government near Honolulu. He was also for a time, consulting engineer to the Quebec Bridge Board, also consulting engineer for the Board of Water Supply, New York City, and for the Public Service Commission of the First district, New York. He had been president of the Western Society of Engineers, American Society of Civil Engineers, and American Institute of Consulting Engineers. In 1910 he was awarded the John Fritz Medal for "notable achievements as a civil engineer," and the same year was elected an honorary member of the Institution of Civil Engineers of Great Britain. In 1912 he received the Elliott-Cresson Medal of the Franklin Institute in recognition of his distinguished achievements in the field of civil engineering. Mr. Noble was deeply interested in anything effecting the status of the engineering profession and during the last few years of his life took a very active part in the organization and upbuilding of the American Institute of Consulting Engineers. He possessed a rare combination of strength, gentleness, tact and discernment. He was universally respected by all who had any business dealings with him, and all appreciated the nobility and simplicity of his character.

THE INDUSTRIAL LABORATORY OF THE SOUTH MANCHURIA RAILWAY.—The railways of this country are not alone in their attempts to encourage the agricultural progress of the communities on their lines. The South Manchuria Railway has for some time maintained a laboratory for the purpose of investigating the suitability of certain manufacturing processes for promoting the industry and commerce of the Leased Territory. The project is just past the initial stage. At the present time the laboratory's weaving and dyeing department is conducting a series of comparative tests in regard to some looms operated by machinery, recently received from abroad, and the old style hand looms. An experimental bean mill has been erected and should soon be ready for operation. A ceramic department is ready to begin the experimental manufacture of brick, china and earthenware. In addition it is planned to start experiments in brewing and distilling as soon as the building for that department is completed. Investigations will be made in regard to the distillation of shamshu, a spirit made from kaoliang, the brewing of huangchui, made from millet and of shaohsingchui, made from rice. The creation of other departments is also under consideration and sites have already been appropriated for the new buildings to house them.

Equipment and Supplies

LOCOMOTIVE BUILDING

THE NORFOLK & WESTERN has ordered 40 Mallet type locomotives from the Baldwin Locomotive Works.

THE VALLEY & SILETZ, Portland, Oregon, has ordered one Prairie type locomotive from the Baldwin Locomotive Works.

CAR BUILDING

THE KANSAS CITY SOUTHERN is in the market for 100 ballast cars.

THE MISSOURI, KANSAS & TEXAS is in the market for 100 tank cars.

THE LOUISVILLE & NASHVILLE is in the market for 1,500 underframes.

THE SAN ANTONIO & ARANSAS PASS is in the market for 50 flat cars.

THE SOUTHERN has ordered 1,000 box cars from the American Car & Foundry Company.

THE DULUTH, MISSABE & NORTHERN has ordered 1,000 ore cars from the Pressed Steel Car Company.

THE BESSEMER & LAKE ERIE has ordered 1,250 hopper cars from the Pressed Steel Car Company, 1,000 hopper cars from the Standard Steel Car Company and 250 hopper cars from the Ralston Steel Car Company.

THE NORTHWESTERN PACIFIC has ordered 9 60-foot coaches and 3 60-foot smoking, 2 60-foot baggage and 3 60-foot combination baggage and mail cars from the Pullman Company. All of these cars will be of all-steel construction.

IRON AND STEEL

THE NORTHERN PACIFIC has ordered 14,000 tons of open hearth rails of the Illinois Steel Company.

SIGNALING

The Federal Signal Company has taken a contract for the installation of an all-electric interlocking plant at Athens, Ala., for the Louisville & Nashville. The machine will have 56 levers. The plant will have complete approach and route locking. The signals will be lighted by electric lamps.

RAILWAY CONSTRUCTION IN GERMAN SOUTHWEST AFRICA.—It is reported that a line of railway will be built between Otjiwarongo and Okahakana in German Southwest Africa. The approximate cost of the line will be \$2,200,000.

GERMAN LOCOMOTIVES FOR SOUTH AFRICA.—The South African Government Railways have recently ordered 10 locomotives from Messrs. Maffei at Munich, and 34 passenger cars from the Hannoverische Waggonfabrik Aktiengesellschaft. The procedure has caused something of a sensation. It was thought that the promise of an early delivery was the cause; but H. Burton, Minister for Railways and Harbors in South Africa, has declared in public that there was also a considerable saving in cost. Compared with the lowest British tenders the difference in favor of the German was about \$65,000 on the locomotives and \$100,000 on the cars. He has also said that for some time past the administration has had reason to be dissatisfied with a continual increase in the prices charged by British firms, and although it was the policy of the government to place orders with British firms if possible, there was ground for reasonable suspicion that there was collaboration among them, and the time had come to introduce a healthier attitude by calling for world-wide tenders. The locomotives will not be built to German design.

Supply Trade News

Edwin S. Woods & Co., Chicago, Ill., have moved their offices to 1024-1028 McCormick building.

W. T. Kyle has resigned from his position with the Duplex Metals Company, Chester, Pa., to engage in other duties.

Theodore Geissman & Co., Inc., district sales agents for rolling mill products, will be located after April 25 at 1720 McCormick building, Chicago.

The Transportation Utilities Company, New York, has acquired the entire business of the General Railway Supply Company, Chicago, effective April 15, 1914.

Elbert J. Fuller, formerly of the Chicago & North Western, has been appointed representative of the Hunt-Spiller Manufacturing Corporation, Boston, Mass., effective April 1.

Edward G. Johns, New York representative of the National Graphite Lubricator Company, Scranton, Pa., has resigned. Announcement of his new connection will be made in a later issue.

The Gary Screw & Bolt Company has moved its office from 72 West Adams street, Chicago, to 1887-1889 Continental & Commercial National Bank Building, Adams and La Salle streets, Chicago.

E. L. Pollock, whose appointment as Chicago sales manager of the National Graphite Lubricator Company, Scranton, Pa., was noted briefly in this column on April 10, will have offices in the People's Gas building instead of the McCormick building.

Arthur T. Davies and Arthur G. Townsend have been appointed district sales managers at Chicago for the C. C. & E. P. Townsend Company, New Brighton, Pa., manufacturers of rivets, wire nails and wire. Their offices are in the Otis building, 10 S. La Salle street, Chicago.

The Titan Storage Battery Company of Newark, N. J., has been established to take over the business of the Baltimore Storage Battery Company of Baltimore, Md. The new company will continue under the same ownership and management as its predecessor. There will be no change in the policy of the latter beyond that of expansion of operations.

The suit of John B. Tate against the Baltimore & Ohio, pending in the United States district court, district of Maryland, was argued on Monday, April 20, before Judge Rose and a jury, and a verdict was rendered in accordance with the instructions of the court for the defendant. This suit was one of considerable importance, as the plaintiff claimed damages of \$22,500 for infringement of his patent; the device was a furnace bearer or expansion pad for connecting the locomotive firebox to the frame, which in various forms is very generally used on all railroads. The Tate patent, No. 643,560, dated February 13, 1900, on which the suit was brought, was held by the judge to be invalid and the verdict was rendered by his instructions upon that ground, the construction being held by him to be fully anticipated by the Sharp British patent No. 3,558 of 1878. The suit was argued by Joseph L. Levy and O. L. Edwards, of New York, for the plaintiff, and William A. Redding and J. Snowden Bell, both of New York, for the defendant.

Emil Gerber, assistant to the president, and general manager of the erecting department of the American Bridge Company, died at his home in Pittsburgh on April 16. Mr. Gerber was born at Reichenbach, Saxony, Germany, January 31, 1858. He was graduated from the Worcester Polytechnic Institute, Worcester, Mass., in the class of 1876. After graduation he taught school for one year at Southbridge, Mass. In 1879 he was appointed assistant engineer of the Sioux City & Pacific, now a part of the Chicago & North Western. As resident engineer he had charge of construction of the Blair bridge, Missouri Valley, Ia., the Sioux City bridge, Sioux City, Ia., and the Jacksonville bridge at Jacksonville, Fla. In 1889 he was made principal assistant engineer to Geo. S. Morison, consulting engineer, resigning in 1897 to accept the position of chief en-

gineer of the Lassig Bridge & Iron Works of Chicago. He was manager of the Lassig plant during the years 1900 and 1901 and was then appointed assistant to the president of the American Bridge Company at Pittsburgh, also serving as operating manager of the Pittsburgh division from 1905 to 1911. In 1911, in addition to his duties as assistant to the president, Mr. Gerber assumed the duties of general manager of the erecting department. During the years 1910 and 1911, the construction of the Gary plant of the American Bridge Company was under his direction. He has been identified with the construction of many of the largest bridges in the United States. He was a member of the American Society of Civil Engineers; the American Railway Engineering Association; the American Iron and Steel Institute; the Western Society of Engineers; the Chicago Engineers' Club and the Duquesne Club, Pittsburgh. Recently he was appointed on a joint committee of the American Society of Civil Engineers and the American Railway Engineering Association, on railroad tracks and roadbeds.

TRADE PUBLICATIONS

PNEUMATIC TOOLS.—The Chicago Pneumatic Tool Company, Chicago, has recently issued bulletin No. E-32, describing Duntley electric tools for street and interurban railways, and bulletin No. E-31 describing the Duntley electric sensitive drilling stand.

GREAT NORTHERN.—The passenger department has issued two new folders on Glacier National Park, describing its scenic attractions and various kinds of vacation tours through the park, giving information as to methods of touring the park, hotel accommodations and expenses, etc.

ELECTRICAL TESTING APPLIANCES.—The Wagner Electric Manufacturing Company, St. Louis, Mo., has recently published bulletin No. 104, entitled "A Manual of Electrical Testing." The booklet describes the Wagner portable testing instruments, but the larger portion of it is in the form of notes on electrical testing.

SIGNAL APPLIANCES.—The Union Switch & Signal Company has recently issued bulletin No. 70 showing the use of eyelets for wire terminals; bulletin No. 72 entitled "Interlocked Circuit Controllers," and a supplement to the 1909 catalog of electric crossing bell appliances containing the drawing references and list prices of the parts of the direct current enclosed interlocking relay, model 12.

FORGES, BLOWERS, EXHAUST FANS, ETC.—General catalog No. 179, from the Buffalo Forge Company, Buffalo, N. Y., is 5 in. by 7½ in. in size and contains 304 pages. Among the various lines of equipment and tools which are illustrated and described in more or less detail are forges, blowers, exhaust fans, disk fans, drills, punches, shears, bending machines, tire setters, combination woodworking machines, steam engines and turbines, fan system apparatus for heating, ventilating, drying and mechanical draft, air washers, humidifiers and dehumidifiers.

LOGGING LOCOMOTIVES.—Record No. 76, published by the Baldwin Locomotive Works, Philadelphia, deals with logging locomotives, both narrow and standard gage. These locomotives range from a 3 ft. gage Forney type locomotive, with a total weight of 31,700 lb., to a standard gage Mikado type, weighing 174,600 lb. Several of the engines included in the description are designed for burning wood, and a great many of them are of the double end type. Several pages are also devoted to geared truck locomotives, and the illustrations bring out the construction of this type very clearly.

AUTOMATIC AIR AND STEAM CONNECTORS.—The Robinson Coupler Company, Washington, D. C., has put in book form the story and the results of the test of the Robinson automatic air and steam hose connector made on the line of the Great Northern at Grand Forks, B. C., by Interstate Commerce Commission officers under the direction of W. P. Borland of the safety appliance division. The book is a fine production from the catalog point of view. Its pages are 11 by 17 in. in size and are very well arranged and printed. The remarkable feature is the insertion of real photographs of the appliance and the trains upon which it was tried. These photographs are 6 by 8 in., and are placed in the pages just as half-tone engravings might be. As several of them are very unusual pictures, anyway, especially those showing a train of 25 cars on a

trestled track of 22 deg. curvature over Dead Man's Gulch, the result is exceptionally good. The results of the test and a description of the apparatus were given in the *Railway Age Gazette* of January 9, 1914, page 88; the book contains the larger part of that data and some additional.

RAIL REPORT.—The Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., has just issued bulletin No. 5 of its series of rail reports, giving chemical and physical tests with sulphur prints and etched sections made on six 3 ft. sections of standard and Titanium treated open hearth 90-lb. A. R. A. section rails rolled during the past summer for a southern road. All test pieces were taken from "A" rail. The results of Brinell hardness and White-Souther endurance tests are given for each rail. The sulphur prints and etched sections show the tendency of Ferro Carbon-Titanium to reduce segregation. The bulletin is prepared in the excellent manner characterizing those previously issued.

BUILDING CONSTRUCTION.—The Condon Company, Chicago, has issued Bulletin No. 4, entitled "Akme Design, as Used in Warehouses and Factories." This bulletin illustrates and describes 16 buildings of reinforced concrete construction built on "Akme" design. The buildings described represent the best modern practice of reinforced concrete flat slab construction, and give an excellent indication of the adaptability of this type of construction of buildings of almost any character. Another bulletin, No. 3, entitled "Akme Design as Used in the Ford Motor Company Service and Assembling Building," describes 11 buildings for that company, the structural features of which were designed by the Condon Company, the consulting engineer of the Ford Motor Company and its architect.

ELECTRICAL APPLIANCES.—The General Electric Company has recently issued bulletin No. 45,601, describing the company's aluminum lightning arresters for alternating current circuits. The bulletin contains 32 pages and is filled with detailed information concerning the arresters and the choke coils for use with them, with notes on the charging operation, installation and ground connections. There are also diagrams and tables of dimensions of both arrester and choke coils. Other bulletins recently issued by the same company are No. 45,600 entitled: Aluminum lightning arresters for use in connection with railway signal circuits; No. 45,590 type dealing with the M L governor for motor driven air compressors; No. 47,400 describing the type S, form K 12 oil switches, and No. A 4,200 dealing with strain insulators and strain clamps.

CAROLINA, CLINCHFIELD & OHIO.—This road has recently issued a remarkably beautiful album of photographic views taken in and around its Clinchfield mines. The book is 10 by 14 in. in size and is a fine example of off-set process work. It contains a striking feature in its three large panoramic views in colors, two of these being approximately 7 by 30 in. in size, and the third about two-thirds as large. One is a view of a portion of the Clinchfield properties; another shows a Clinchfield coal train over a mile in length, and the third the yard and other facilities at Charleston, S. C. The book proper contains smaller views showing the Clinchfield's methods of mining coal, the housing of its employees and the like. It is intended to give the reader an idea of the various processes involved in the mining and transportation of coal.

TWIST DRILLS, THEIR USES AND ABUSES.—This is the title of a small booklet which has been published by The Cleveland Twist Drill Company, Cleveland, Ohio. After an interesting discussion of the theory and design of the twist drill, a considerable part of the booklet is devoted to a discussion of experiments with drills of various shapes. This includes torsion and feed pressure charts and discusses the difference in the shape of the groove, the form of chip as an index to a proper working drill, the effect of the angle of the point on the feed pressure, how the point should be ground, the importance of having the cutting edges at equal angles and of equal length, the importance of lip clearance, the cause of chipped cutting edges, the angle of lip clearance and the angle of the spiral. Several pages are devoted to drilling "helps and hints." Records of remarkable results which were obtained from a test of the Cleveland drill at the Atlantic City conventions in June, 1911, are discussed and the booklet closes with a table of the revolutions per minute to secure different cutting speeds for various diameters of drills.

Railway Construction

ALABAMA ROADS (Electric).—Plans are being made to build an electric line from Opelika, Ala., southwest to Auburn, about 10 miles. It is understood that Chicago capitalists are back of the project. W. S. Lounsbury, secretary of the Opelika and Lee county Chamber of Commerce is quoted as saying that surveys will be made at once, and it is expected that grading work will be started in the near future.

ATLANTIC & CAROLINA.—Incorporated in North Carolina with \$50,000 capital to build from Warsaw, N. C., southeast to Kenansville, 10 miles. The line has been finished from Warsaw to a point within two miles of Kenansville, and it is expected that all of the work will be finished in May. A. R. Turnbull, president and manager of the Rowland Lumber Company, Bowdens, N. C., is back of the project.

CAROLINA RAILROAD.—An officer of this company which operates a line from Kingston, N. C., north to Snow Hill, 14.9 miles, writes regarding the report that an extension is to be built northwest to Stantonsburg, about 16 miles, that nothing definite has been decided regarding such an extension.

CEDAR RAPIDS TERMINAL TRANSFER (Electric).—An officer writes that this company has been incorporated with \$200,000 capital in Iowa, to build a belt line in Cedar Rapids. The plans also call for putting up new interurban passenger and freight stations. It has not yet been decided when bids will be asked for the work. W. G. Dows, president, Cedar Rapids.

CHARLESTON, PARKERSBURG & NORTHERN.—An officer writes that this company has entered into an agreement with the West Virginia Securities & Construction Company to finance and construct a line from Charleston, W. Va., north to Parkersburg, 74 miles. Surveys have been completed and right of way and franchises have been secured for more than 90 per cent. of the entire distance, and the company expects to be ready to let contracts about July 1. Henry H. Archer, president, Parkersburg. (April 17, p. 927.)

FREDERICK & BRUNSWICK.—See Hagerstown & Frederick.

HAGERSTOWN & FREDERICK (Electric).—Under the name of the Frederick & Brunswick, a contract was let in 1912, for work on a one-mile section of an extension of the Frederick Railroad from Jefferson, Md., west to Petersville, thence south to Brunswick, nine miles. The company has recently been granted an extension of its franchise, it is said, to build about seven miles between Jefferson and Brunswick.

HELENA, PARKIN & NORTHERN.—The Lansing Company, A. C. Stebbins, vice-president and general manager, Lansing, Mich., is desirous of letting a contract for grading this road for 15 miles from Parkin, Ark.

ILLINOIS CENTRAL.—An officer writes that a contract has been given to the Robert Grace Contracting Company, Pittsburgh, Pa., for work between Gibbs, Tenn., and Curve. This is part of the second main track improvements being carried out between Fulton, Ky., and Memphis, Tenn. The work on cuts involves handling about 4,300 cu. yd., and on fills 18,000 cu. yd. to the mile. The maximum grade will be 0.5 per cent., and the maximum curvature 4 deg. There will be through plate girder bridges of 60 ft., 80 ft. and 108 ft., respectively.

METOLIUS, PRINEVILLE & EASTERN.—This company, which was recently granted incorporation in the state of Washington with \$500,000 capital to build from Prineville, Ore., northwest to Metolius, about 32 miles, will let contracts soon, it is said, to build the line. H. P. Scheel, Tacoma, Wash., W. G. Scheel and W. McArthur, Tenino, are incorporators. (March 20, p. 703.)

MORGANTOWN & WHEELING (Electric).—A contract has been given to Keely Brothers & Gilmore, Morgantown, W. Va., it is said, for the masonry and grading on an extension from Cassville, W. Va., northwest to Blacksville, about 14.5 miles. R. D. Hennen, chief engineer, Morgantown.

NASHVILLE, SHILOH & CORINTH.—This company, which was organized last year, has recently been given a charter in Ten-

nessee, with a capital of \$100,000. The plans call for building a line from Nashville, Tenn., southwest through Davidson, Williamson, Hickman, Perry and Wayne counties, Tennessee, to Corinth, Miss., about 160 miles. J. H. Carpenter, J. D. Walker, A. W. Wallace and T. A. Hazard are interested.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, has awarded the contract for the construction of Section No. 1 of Route No. 33 to Booth & Flinn, Ltd., the lowest bidder, for \$2,059,182. This section runs from Trinity place and Morris street mainly through Whitehall street to South street, in the borough of Manhattan. The commission has asked for bids, on May 12, for the construction of Section No. 2 of Route No. 20, the Canal street crosstown subway in Manhattan. This subway will connect the tracks coming over the Manhattan bridge from the Fourth avenue subway and the Brighton Beach line with the Broadway subway in Manhattan.

PACIFIC, PEACE RIVER & ATHABASCA.—We are told that this company will make a reconnaissance this coming summer for the line projected from a point at or near the mouth of Naas river on the Pacific coast, about 40 miles north of Prince Rupert, B. C., thence in a general easterly direction via a point near Ground Hog mountain, traversing large anthracite coal fields in that district, and via Hogen pass and along Peace river valley to Fort McMurray, thence southeasterly to Prince Albert, Sask., about 1,500 miles. The company was granted a charter on February 17 of this year with a capital of \$15,000,000, and expects to begin actual construction work by 1915. G. A. Thomas, Cardiff, Wales, is interested. Valentine Quinn and Charles F. Law, Bank of British North America building, Vancouver, B. C., may be addressed. (November 14, p. 939.)

SAN DIEGO & ARIZONA.—An officer of this company, which started work some time ago on a line from Seeley, Cal., west through California and Mexico to San Diego, Cal., 139 miles, writes that track has been laid from Seeley west on 17.5 miles and on the western end on 48.2 miles. Work is now under way by Robert Sherer & Co., Los Angeles, on a section of seven miles on the eastern end and on six miles on the western end. (February 20, p. 407.)

SOUTHERN RAILWAY.—According to press reports, a contract has been given to R. B. Oliver, Maryville, Tenn., to carry out grading work in the yards at Spencer, N. C.

WAUHATCHIE RAILWAY EXTENSION COMPANY.—Application has been made for a charter in Tennessee to build from Wauhatchie, Tenn., north to Chattanooga, five miles. There will be a bridge over Chattanooga creek of either steel or concrete construction. C. A. Lyster, president, Chattanooga.

RAILWAY STRUCTURES

BIRMINGHAM, ALA.—A viaduct is to be built on First avenue, in Birmingham, over the tracks of the Louisville & Nashville and the Southern railway, it is said, jointly by these two railways, the City of Birmingham, the Birmingham Railway, Light & Power Company and the Sloss-Sheffield Steel & Iron Company. The plans for carrying out the work are to be made by the Louisville & Nashville and bids will be asked for early in June.

CLEVELAND, O.—The Lake Shore & Michigan Southern and the Pennsylvania Lines have filed an application with the federal government for permission to make a 900-foot fill into the lake and add 72 acres to their holdings for the purpose of building a freight terminal in connection with the plans for a union passenger station. The freight terminal plan has aroused considerable opposition on the part of the city authorities. Plans for the passenger terminal, by D. H. Burnham & Co., Chicago, reached the city on April 12. They provide for a 6-story building at the foot of the mall between the county court house and the new city hall, 460 ft. by 205 ft. in area, with two stories below the street level. The five upper stories are to be used for office purposes. The plans have not been finally approved.

ST. JOHNS, QUE.—The Railway Commission of Canada has authorized the Canadian Pacific to build a bridge over Richelieu street in St. Johns, also to reconstruct the bridges over Irish creek near Jasper, Ont., and over Three Mile creek near Fredrickton Junction, N. B.

Railway Financial News

ATLANTA, BIRMINGHAM & ATLANTIC.—John L. Kaul, of Birmingham, Ala., has been elected a director of the Alabama Great Southern, succeeding R. D. Lankford, deceased.

ATLANTIC COAST LINE.—The company is offering to exchange new series A general unified mortgage $4\frac{1}{2}$ per cent. bonds for outstanding 4 per cent. unified mortgage bonds of November 16, 1909. Of the total \$30,847,000 of these 4 per cent. bonds issued, \$21,330,000 were in the treasury of the Atlantic Coast Line Railroad and \$3,008,000 in the treasury of the Atlantic Coast Line Company, and these bonds will be exchanged for the new $4\frac{1}{2}$'s.

KANSAS CITY, MEXICO & ORIENT.—The bondholders' protective committee, of which Lord Monson is chairman, and the American members are Harry Bronner, Willard V. King, L. F. Loree, Theodore P. Shonts, S. Davies Warfield, W. P. Kemper and E. D. Stair, are offering \$5,500,000 6 per cent. 2-year notes at $97\frac{1}{2}$. The notes are to be issued by a new company. The security of the notes is as follows:

"Until the foreclosure sale is completed and the railroad vested in a new company to be formed, which will issue the notes, subscribers for the same must look exclusively to the security of the \$18,870,754 deposited bonds, and the members of the bondholders' committee are not to be personally liable for the amount subscribed or interest thereon, but the amount subscribed will be retained by the trustees to make such of the payments above mentioned as may be necessary to enable the notes to be secured on the 725 miles of completed railroad now in operation in the states of Kansas, Oklahoma and Texas. The charge on the portion of the railroad in the states of Kansas and Oklahoma will be direct, while the charge on the railroad in the state of Texas will be effected by the trustees for the notes holding all the capital of a Texas company to be formed to acquire the portion of the railroad in that state, in conformity with the laws thereof."

LEHIGH VALLEY.—William P. Clyde has been elected a director, succeeding Charles Steele, of J. P. Morgan & Co., resigned.

MISSOURI, KANSAS & TEXAS.—The directors on Wednesday voted to pass the regular semi-annual dividend of 2 per cent. on the preferred. The company has been paying dividends at the annual rate of 4 per cent. on its preferred stock since 1906.

NEW YORK CENTRAL & HUDSON RIVER.—R. S. Lovett, chairman of the board of the Union Pacific, has been elected a director of the New York Central & Hudson River, succeeding Lewis Cass Ledyard. Ogden Mills has been elected a director, succeeding his father, D. O. Mills. Harold S. Vanderbilt was elected a director, succeeding J. P. Morgan.

A finance committee has been selected, consisting of William K. Vanderbilt, George F. Baker, William Rockefeller, R. S. Lovett and William K. Vanderbilt, Jr.

NEW YORK, NEW HAVEN & HARTFORD.—H. V. Whipple and Edward E. Field, officers of the Billard Company who refused to answer questions of the Interstate Commerce Commission in its present inquiry into the New York, New Haven & Hartford's affairs, have notified the commission, through their counsel, that they are willing to appear before the commission and answer all inquiries.

The New York, New Haven & Hartford, it is understood, has made arrangements with J. P. Morgan & Co., New York, to turn over to these bankers certain assets of the company and receive in exchange about \$64,000,000 with which to meet about \$54,000,000 short term notes falling due in the immediate future, and for its immediate capital needs.

Stockholders at the meeting on April 21, by a vote of 958,346 shares to 700 shares, ratified the agreement made between the chairman of the board and the Department of Justice, published at some length in these columns last week. Stockholders also voted to amend the by-laws so as to provide for a board of directors of 23 as a maximum and 15 as a minimum, the maximum heretofore having been 27. There are now 23 members of the board.

ANNUAL REPORTS

THE CLEVELAND, CINCINNATI, CHICAGO AND ST. LOUIS RAILWAY COMPANY ANNUAL REPORT

To the stockholders of

THE CLEVELAND CINCINNATI CHICAGO & ST. LOUIS RAILWAY COMPANY:
The Board of Directors herewith submits its report for the year ended December 31, 1913, with statements showing the results for the year and the financial condition of the company.

The mileage embraced in the operation of the road is as follows:

	Miles
Main line and branches owned.....	1,239.43
Proprietary lines	433.33
Leased lines	204.70
Trackage rights	136.32
Total road operated	2,013.78

A statement showing in detail the mileage of road operated will be found on another page.

There was no change in the capital stock during the year, the amounts authorized and outstanding on December 31, 1913, being as follows:

Preferred stock authorized.....	\$10,000,000.00
Common stock authorized	50,000,000.00

Total preferred and common stock authorized.....	\$60,000,000.00
Preferred stock issued and outstanding.....	\$10,000,000.00
Common stock issued and outstanding.....	47,056,300.00
	\$57,056,300.00

Balance common stock authorized but not issued, December 31, 1913	\$2,943,700.00
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In January proceedings were completed merging with this company the Cairo Vincennes & Chicago Railway Company and the Chicago Indianapolis & St. Louis Short Line Railway Company, of Illinois, and the Cincinnati & Springfield Railway Company, the Columbus Springfield & Cincinnati Railway Company, the Harrison Branch Railroad Company and the Findlay Belt Railway Company, of Ohio. Looking to the merger with this company of the Cincinnati Wabash & Michigan Railway Company, the Fairland Franklin & Martinsville Railroad Company, the White Water Railroad Company and the Cincinnati & Southern Ohio River Railway Company, Indiana lines, in which this company owns the entire stock, proper action was taken in December by the stockholders and directors of this and the other companies severally. A completion of this merger awaits the approval of the Public Service Commission of Indiana.

The funded debt outstanding December 31, 1912, was..... \$87,735,722.71

It has been increased during the year as follows:

C C C & St L Ry general mortgage bonds, issued for additions and betterments.....	\$748,000.00
C C C & St L Ry general mortgage bonds, issued for retirement of prior lien bonds.....	9,000.00
To place upon the general books of the Company its pro rata liability in connection with the certificates issued under the New York Central Lines Equipment Trust Agreement of 1913..	1,087,551.00
C I & St L Short Line Ry Co first mortgage bonds added to funded debt account purchase of that property	3,000,000.00
	4,844,551.00
	\$92,580,273.71

It has been decreased during the year as follows:

Pro rata equipment trust certificates due January 1, 1913	\$359,516.02
Pro rata equipment trust certificates due November 1, 1913	246,689.81
C I St L & C Ry Co first mortgage bonds retired	8,000.00
C I St L & C Ry Co general first mortgage bonds retired	23,000.00
	637,205.83
Total funded debt outstanding December 31, 1913.....	\$91,943,067.88

Out of \$24,000,000.00 of certificates authorized under the New York Central Lines Equipment Trust of 1913 there were issued during the year an aggregate of \$15,494,000.00. The cost of the equipment to be assigned to this Company in connection with the issue of these latter certificates is approximately \$1,208,390.00, and its pro rata amount of certificates representing not to exceed 90% of the cost is \$1,087,551.00. Full particulars as to the character of the equipment acquired are set forth upon another page of this report.

The sinking fund of the Cleveland Cincinnati Chicago & St. Louis Railway Company's St. Louis Division first collateral trust bonds has been increased during the year by the purchase of 29 bonds, par value \$29,000.00, making a total of 645 bonds, par value \$645,000.00, in the hands of the Central Trust Company, trustee of this fund.

The operation of the property for the first two months of the year indicated a substantial gain over the 1912 results, but the disastrous floods in Ohio, Indiana and Illinois in March caused a suspension of operation of much of the railroad for about thirty days, doing damage to the property of this company that will entail an outlay of about \$3,000,000 in the restoration of roadway, bridges, buildings, etc.

Rain began to fall over the Ohio Valley Sunday, March 23, and continued until March 27. The rainfall was general over the entire valley, but much heavier in the states of Ohio and Indiana, where it varied according to location. At Marietta, Ohio, the rainfall was only 2.7 inches, while at Bellefontaine, Ohio, it was 11.2 inches, the average rainfall in Ohio and Indiana being something like 7.8 inches.

It was the unprecedented rainfall for the forty-eight hours ending Tuesday morning, March 25, that caused the extreme high water in the Great Miami, Scioto, Wabash, White, Blue, White Water and Sandusky Rivers. The Great Miami exceeded all previous records at various points by from 7.7 feet to 13.6 feet, the White Water by from 11 to 14 feet, while practically every stream in the two states was reported higher than any previous record.

This was followed in a few days by the rising of the Ohio to within a few inches of its highest record, cutting off all traffic for ten days at Cincinnati, damaging the tracks at Lawrenceburg and overflowing that place. A line drawn around the outermost points where bridges were gone, or the line cut, embraced 1,230 miles of road of this company.

The greater part of the damage to this company's property occurred within a radius of 125 miles of Cincinnati, Ohio. A total of 38 bridges were either totally or partially destroyed, necessitating rebuilding, including

3 across the Miami River, 2 across the Mad River, 4 across the White Water River and 2 across the White River. About 50 miles of track and embankment were washed out, varying from 1 to 25 feet in depth, and the combination freight and passenger depots at Brookville, Indiana; New Trenton, Indiana, and Cedar Grove, Indiana, were washed away. Interlocking plants at Dayton, Ohio; Columbus, Ohio, and Indianapolis, Indiana, were considerably damaged.

In addition to the property damage, as above mentioned, the entire operation of the road was paralyzed by the floods, resulting in a loss in gross earnings estimated at \$1,200,000, due to the suspension of business in the flooded areas. At the same time, this company was unable to accept freight coming to it from connecting lines, which caused the holding back of such business on connections and accumulations at junction points, and, together with the slower movement of traffic, resulted in an increase in car hire payments of approximately \$550,000 for the year.

Every possible effort was exerted and no justifiable expense spared to restore traffic as promptly as possible and thus bring relief to the afflicted districts; the resources of this company's affiliated lines, both as to men and material, being freely furnished; which assistance proved of advantage in restoring the operation of the property.

Although it will be evident that it is difficult to estimate the effect of the disaster upon the operation, both within and without the zone of the flood (which effect continued to a greater or less extent throughout the remainder of the year), the resulting increase in transportation expenses is estimated at \$400,000, bringing the total of loss and damage to this company's property and business, attributable to the flood, well above \$5,000,000.

The road is, however, recovering from the catastrophe at as rapid a rate as circumstances will permit, and the restoration of the property, in very much better shape than the original construction, is taking place. This will put it in a position to better cope with similar circumstances, should they ever arise again.

Practically all the roadbed destroyed has been rebuilt to permanent grade, and all tracks washed out have been rebuilt. The work of rebuilding the bridges is now in progress, and will not be completed until some time in 1914. The depots destroyed are being rebuilt and the interlocking and other damages have been repaired.

On the Peoria and Eastern Railway a total of 10 miles of roadbed and track was washed out, the greater part of it being located between Donnellsville, Ohio, and Laura, Ohio. Three bridges were damaged and will have to be rebuilt. One bridge is now being rebuilt, but nothing has been done towards restoring the other two on account of pending legislation. All damages to roadbed and track have been repaired.

SUMMARY OF FINANCIAL OPERATIONS AFFECTING INCOME

	1913	1912	Increase or Decrease
RAIL OPERATIONS	2,013.78	2,011.64	2.14 miles
Revenues	\$33,840,298.14	\$32,714,238.27	\$1,126,059.87
Expenses	29,599,362.15	24,359,744.53	5,239,617.62
NET REVENUE RAIL OPERATIONS	\$4,240,935.99	\$8,354,493.74	—\$4,113,557.75
Per cent of revenue.....	(87.47%)	(74.46%)	(13.01%)
AUXILIARY OPERATIONS			
Revenues	\$405,666.47	\$378,302.75	\$27,363.72
Expenses	416,311.99	406,785.17	9,526.82
NET DEFICIT AUXILIARY OPERATIONS	\$10,645.52	\$28,482.42	—\$17,836.90
NET OPERATING REVENUE.....	\$4,230,290.47	\$8,326,011.32	—\$4,095,720.85
RAILWAY TAX ACCRUALS.....	1,287,962.23	1,190,242.60	97,719.63
OPERATING INCOME	\$2,942,328.24	\$7,135,768.72	—\$4,193,440.48
OTHER INCOME			
Joint facility rent income.....	\$351,188.68	\$341,589.44	\$9,599.24
Miscellaneous rent income.....	140,997.50	*185,612.45	—44,614.95
Miscellaneous physical property —net profit	69,926.10	*33,404.36	36,521.74
Dividends on stocks owned.....	57,665.15	40,967.17	16,697.98
Interest on bonds owned.....	23,240.00	35,040.00	—11,800.00
Interest on notes, loans, etc....	115,416.71	73,645.08	41,771.63
Miscellaneous income	28,660.82	34,490.00	—5,829.18
Interest on sinking fund bonds owned	24,920.00	12,060.00	12,860.00
TOTAL OTHER INCOME.....	\$812,014.96	\$756,808.50	\$55,206.46
GROSS INCOME	\$3,754,343.20	\$7,892,577.22	—\$4,138,234.02
DEDUCTIONS FROM GROSS INCOME			
For lease of other roads.....	\$242,856.00	*\$267,093.02	—\$24,237.02
Hire of equipment—debit balance	1,220,037.23	505,122.44	714,914.79
Joint facility rent payable.....	505,833.11	482,920.65	22,912.46
Miscellaneous rent payable.....	145,595.05	140,960.66	4,634.39
Miscellaneous tax accruals.....	6,566.20	2,970.00	3,596.20
Separately operated properties —loss	14,750.59	71,710.76	—56,960.17
Central Indiana Railway—deficit	61,872.86	54,245.00	7,627.86
Mount Gilead Short Line Ry—deficit	4,317.31	.....	4,317.31
Kankakee and Seneca Railroad —deficit	12,167.17	.....	12,167.17
Interest on funded debt.....	3,915,071.19	*3,855,167.87	59,903.32
Interest on unfunded debt.....	265,488.04	154,439.39	111,048.65
Miscellaneous deductions	32,414.51	1,535.68	30,878.83
Appropriation of income to sinking fund	24,920.00	12,060.00	12,860.00
TOTAL DEDUCTIONS FROM GROSS INCOME	\$6,451,889.26	\$5,548,225.47	\$903,663.79
NET DEFICIT (Income in 1912)	\$2,697,546.06	\$2,344,351.75	—\$5,041,897.81
Dividends preferred stock.....	.....	500,000.00	—500,000.00

*Revised for purposes of comparison.

DEFICIT FOR THE YEAR (Surplus in 1912)	\$2,697,546.06	\$1,844,351.75	—\$4,541,897.81
Amount to credit of profit and loss (free surplus) December 31, 1912			\$1,497,939.97
ADD:			
Interest 1905 to 1912 inclusive on cost of coal property in Saline and Williamson Counties..	\$305,073.34		
Adjustment of sundry accounts.....	6,607.73	311,681.07	
			\$1,809,621.04
DEDUCT:			
Deficit for the year 1913.....	\$2,697,546.06		
Dividend of 2½% on preferred stock payable from the net income of the year ended June 30, 1913	250,000.00		
Discount on C C C & St L Ry Co general mortgage bonds	220,440.00		
Discount, commissions and expenses N Y C Lines equipment trust certificates 1913.....	31,278.18	3,199,264.24	
BALANCE TO DEBIT OF PROFIT AND LOSS DECEMBER 31, 1913.			\$1,389,643.20

The gross operating revenues for the year were \$33,840,298.14, an increase over the preceding year of \$1,126,059.87, of which \$1,038,230.54 was in transportation revenue and \$87,829.33 in revenue from operations other than transportation.

Freight revenue for the year, \$22,713,958.84, shows an increase of \$545,956.74. The average revenue per ton per mile was 5.47 mills, an increase of .04 mills. The average haul per mile increased 1.6 miles, and the average amount received per ton of freight was 87.3 cents as compared with 85.9 cents in 1912. The total revenue tonnage increased 191,907 tons, due to the increases in the products of forests and in manufactures, partially offset by decreases in the products of agriculture, animals and mines.

Passenger revenue for the year was \$8,171,751.82, an increase of \$393,616.24, there being increases in interline business of \$100,945.16 and in local business of \$292,671.08. The average revenue per passenger decreased 3 cents and the average revenue per passenger mile decreased .009 cents. The number of revenue passengers increased 618,563; average distance carried decreased 1.4 miles, and passengers carried one mile increased 22,658,860.

Mail revenue for the year shows an increase of \$26,495.51, of which amount \$10,768.44 is due to increased compensation allowed by the Government account of the inauguration of the parcel post. The balance of the increase is more apparent than real and results from a comparison with the 1912 revenue, which it was necessary to reduce approximately \$18,000.00 on account of an over-credit in 1911.

Since the regular quadrennial weighing of mails in 1911, the parcel post has been inaugurated, the original weight limit of parcels being eleven pounds, for the transportation of which Congress has allowed an increase in compensation (effective from July 1st, 1913, and until the next regular weighing of the mails) of not to exceed five per cent, which is equal to an annual increase of \$19,413.99, in the compensation paid this company for carrying the mails.

The situation in reference to mail pay, however, is still unsatisfactory. Pending the report of the joint Congressional Committee now sitting and action upon this report by Congress, the conditions have been much aggravated by the enlargement of the parcel post, with substantially no return to the railroads for the increased service. This new feature of mail transportation has had the effect of curtailing express revenue without compensating return from other sources of traffic.

Express revenue increased \$79,659.50 and represents the proportion due this company of the earnings from increased express traffic largely during the first eight months.

Revenues from operations other than transportation show an increase of \$87,829.33, of which \$57,643.62 is in car service (demurrage) and \$19,230.55 is in miscellaneous revenue, the increase in the latter being largely due to payments by other carrier lines for detour service during the flood period.

The gross operating expenses for the year were \$29,599,362.15, an increase of \$5,239,617.62, divided by groups as follows:

Maintenance of way and structures.....	\$1,250,078.56
Maintenance of equipment repairs.....	2,104,377.58
Maintenance of equipment renewals and depreciation	130,757.06
Traffic expenses	47,932.10
Transportation expenses	1,652,957.42
General expenses	53,514.90
Total increase	\$5,239,617.62

The decrease in maintenance of way and structures is distributed through practically all of the accounts. The pay rolls of this department decreased \$78,615.99, and the renewals decreased \$175,910.80.

The increase of \$2,104,377.58 in equipment repairs is due to increases in steam locomotives repairs \$549,642.32, passenger train cars repairs \$114,926.35, and freight train cars repairs \$1,317,465.76. The pay rolls of the maintenance of equipment department increased \$656,761.78, of which approximately \$85,000.00 is due to increased rates of pay. The increase in freight car repairs is due to the expenditures necessary to provide cars for the business involving work in outside shops on account of deficiency of owned facilities for this purpose.

Maintenance of equipment renewals and depreciation increased \$130,757.06. All retirements of equipment during the year, including the amount of depreciation not already accrued thereon, have been charged to operating expenses, and in addition thereto depreciation at the rate of two per cent per annum has been accrued since January 1, 1913, upon the cost of equipment of all classes and charged to expenses.

The increase in traffic expenses, excluding those incident to the flood, was \$40,708.33, and was in superintendence, advertising, and stationery and printing, the last item increasing \$44,935.60, due to the expense of printing tariffs filed in the advanced rate case.

Transportation expenses, including flood expenses, increased \$1,652,957.42. Pay rolls increased \$1,174,314.21, the result of increased rates of compensation paid trainmen, together with increases in the force of this department, due to flood condition and increase in tonnage handled. Payments on account of loss and damage-freight increased \$251,734.11, and injuries to persons increased \$47,409.22.

General expenses increased \$51,842.91, of which \$41,306.65 is in salaries and expenses of clerks and attendants, due principally to more extensive revision of way bills and the more expeditious handling of freight claims in compliance with Federal requirements, \$8,852.20 in general office supplies and expenses, \$20,640.14 in law expenses and \$11,668.85 in stationery and printing, largely offset by decreases in insurance of \$18,340.86 and in other expenses of \$9,536.89.

The net deficit from auxiliary operation decreased \$17,836.90, almost entirely accounted for by the smaller loss in the operation of dining cars.

Of the increase of \$97,719.63 in taxes, \$50,849.00 is due to increases in the tax rates applicable in the different states, \$19,904.00 to additional property returned for assessment, \$2,771.00 to increase in the appraisal of the property by the different state board and local assessors, and \$13,810.52 to increase in the tax on gross earnings in the State of Ohio.

Operating income for the year decreased \$4,193,440.48. Other income was \$812,014.96, an increase of \$55,206.46, due to increases in dividends on stocks owned and in interest on notes, loans, etc., partially offset by decrease in interest on bonds owned and in miscellaneous income. Gross income was \$3,754,343.20, a decrease from the previous year of \$4,138,234.02.

There was a net increase in deductions from gross income of \$903,663.79, the principal items of which were: hire of equipment debit balance increase, \$714,914.79—of which \$554,017.97 was in per diem on freight cars (due to accumulated equipment on line on account of retarded deliveries at the time of the flood and thereafter, increased volume of business and increased per diem rate), \$38,290.71 in rent of passenger equipment and \$122,606.11 in locomotive and work equipment; interest on funded debt, which includes equipment trust certificates, increase \$59,903.32; interest on unfunded debt, increase \$111,048.65, due to additional loans negotiated during the year; miscellaneous deductions, increase \$30,878.83, these increases having been partly offset by a decrease in loss from separately operated properties of \$56,960.17, almost entirely on account of discontinuance of participation in Merchants Despatch Transportation Company's deficit.

The deficit for the year was \$2,697,546.06, as compared with a surplus for 1912 of \$1,844,351.75.

During the year there was expended for additions and betterments to the property \$3,163,695.73, which was charged to cost of road and equipment. A detailed statement of this expenditure will be found on another page.

The notes payable at the close of 1912 were \$2,745,000.00. On December 31, 1913, the aggregate was \$7,454,480.00, an increase of \$4,709,480.00.

The company advanced during the year for construction on the Saline Valley Railway \$1,081.73. All of the capital stock and funded debt of this company is owned by The Cleveland Cincinnati Chicago and St Louis Railway Company.

There has been charged to income the company's proportion of the deficit resulting from the operation of the Central Indiana Railway for the year, amounting to \$61,872.86, an increase of \$7,627.86.

The operation of the Kankakee & Seneca Railroad (for which separate accounts are maintained) shows revenues for the year \$87,402.72, operating expenses, taxes and additions and betterments \$111,737.06, deficit \$24,334.34, one-half of which, \$12,167.17, was charged to income in 1913.

The Mt Gilead Short Line (for which separate accounts are maintained) shows revenues for the year \$5,087.36, operating expenses and taxes \$9,535.17, other income \$130.50, deficit \$4,317.31, which amount has been charged to income in 1913.

The line of the Peoria & Eastern Division from Springfield, Ohio, to Indianapolis, Indiana, is owned by The Cleveland Cincinnati Chicago & St Louis Railway Company subject to a purchase money lien; and the line from Indianapolis, Indiana, to Pekin, Illinois, is leased to this company. Separate accounts for this division are maintained and the operations for the year 1913 show revenues amounting to \$3,387,433.69, operating expenses and taxes \$2,931,447.36, operating income \$455,986.33, other income \$29,101.78, gross income \$485,088.11, deductions from gross income \$637,203.10, deficit \$152,114.99. The charges to operating expenses include \$115,691.85 on account of flood expenses.

Separate report has been issued showing the financial condition and results from operation for the year of The Cincinnati Northern Railroad Company.

The credit balance in equipment replacement fund on December 31, 1912, was	\$1,497,124.75
There was added during the year 1913 representing the value of equipment retired.....	\$819,811.13
There was charged against this fund the following:	
Locomotives	\$199,189.82
Passenger cars	52,808.77
Freight cars	43,129.07
Work cars	19,396.01
	314,523.67
Balance December 31, 1913.....	\$2,002,412.21

During the year an understanding was reached between the authorities of the City of Indianapolis and this and other companies, including the Indianapolis Union Railway Company, for the completion of grade separation in that city. An injunction suit and a change of city administration may stay the execution of contracts and delay the progress of the work.

On November 1, 1913, this company entered into an agreement with the Receiver of the Wheeling & Lake Erie Railroad Company whereby the latter company will use this company's main and passing tracks between Wellington, Ohio, and a point 1½ miles east of Linndale, Ohio, a distance of approximately 32 miles, for the purpose only of handling its freight trains. The construction of the necessary connections and interlockers is now under consideration by the two companies and it is anticipated that early in the present year this work will be completed, after which the contract will become operative.

During the year 1913, practically all of the railroads in the eastern section of the United States, operating in the territory east of the Mississippi and north of the Ohio and Potomac Rivers, were parties to arbitrations, first with the Brotherhood of Locomotive Firemen and Enginemen, and later with the Order of Railway Conductors and Brotherhood of Railroad Trainmen, acting jointly.

The concerted movement of the firemen demanded standardization of pay and working conditions, involving an increase in the wages of firemen employed by this company of approximately 59 per cent, and resulted in arbitration under the Erdman Act. The railroads selected Mr. William W. Atterbury, Vice President of the Pennsylvania Railroad, and the firemen designated Mr. Albert Phillips, Vice President of the Brotherhood of Locomotive Firemen and Enginemen. The third member of the Board (appointed by the Federal Authorities) was the Honorable William L. Chambers, of Washington, D. C., who was selected Chairman.

The arbitration proceedings were held in New York from March 10 to April 5, and on April 23 an award was handed down which provided for an increase in the wages paid to firemen on the Cleveland Cincinnati Chicago & St Louis Railway of 10.85%, or approximately \$7,852.00 per annum.

While the Conference Committee of Managers were engaged in preparation for the firemen's arbitration proceedings, a petition approved October 19, 1912, by the Eastern Association of General Committees, Order of Railway Conductors and Brotherhood of Railroad Trainmen for standardization of rates of pay, involving an increase in the pay rolls of this company, estimated at \$586,000.00, or 21% per annum was presented to all roads east of Chicago and north of the Chesapeake & Ohio Railway, and to the Conference Committee of Managers as well, with a view of ascertaining whether the matter would be handled by the several roads individually or in concert. United action was determined upon by the

roads concerned, and an arbitration board consisting of six members was agreed to under the terms of the Newlands Amendment of the Erdman Act.

The railroads were represented upon this Board by Mr. W. W. Atterbury, Vice President, Pennsylvania Railroad, and Mr. A. H. Smith, Senior Vice President, New York Central Lines.

The conductors and trainmen's organizations designated as their representatives Mr. L. E. Sheppard, Senior Vice President, Order of Railway Conductors and Mr. D. L. Cease, Editor and Manager, "The Railroad Trainman;" and the four members so selected met and completed their Board by choosing the Honorable Seth Low and Doctor John H. Finley, President, the College of the City of New York.

The Board so constituted, having chosen Mr. Seth Low as its Chairman, heard testimony between September 11 and October 15, and on November 10 handed down its award, which provided for an increase in the wages of conductors and trainmen employed by this company of approximately \$189,000.00 per annum, or 6.7%.

Section 19-A of the Act to Regulate Commerce, which became a law on the first day of March, 1913, provides that the Interstate Commerce Commission shall investigate and ascertain the value of all the property owned or used by all railroad companies. The Commission required to ascertain and report in detail as to each piece of property owned or used, the original cost to date, cost of reproduction new, cost of reproduction less depreciation; also all other values and elements of value, if any, of such property. It is also required to investigate and to report upon the history and organization of the present and of any previous corporation operating the property; upon moneys received by reason of any issues of stocks, bonds, or other securities; upon the syndicating, banking, and other financial arrangements under which such issues were made and the expense thereof, together with a large number of other matters unnecessary to specify in detail. The company is required to co-operate with and aid in the work of the valuation of its property in such particulars and to such extent as the Commission may require and direct. It is impossible even to approximate at this time the expense which will thereby be incurred.

The performance of the work for the company has been undertaken by a Valuation Committee appointed by the Board of Directors. The committee is engaged in the preliminary inquiries essential to the proper organization of the necessary forces and in making the preparation required to comply with the requirements of the Commission.

Shortly after the passage of the Act, the principal carriers of the country including this company, organized an association known as The Presidents' Conference Committee. This committee, in an informal conference with the Commission, pledged its hearty co-operation in the work. It has appointed an Engineering Committee consisting of fifteen members, which for several months past has been engaged in discussing with the Board of Engineers appointed by the Commission, the maps, profiles and schedules

which shall be furnished by the carriers to the Commission for its use in inspecting, listing and valuing the property of the carriers. The questions involved have been of great importance and difficulty, and as a result these conferences have necessarily taken a very considerable time and no active work has been undertaken by the Commission, upon the property of this company. It is expected, however, that progress will be made during the year 1914.

In May, 1913, The Cleveland Cincinnati Chicago & St. Louis Railway Company joined with other roads in the official classification territory in an application to the Interstate Commerce Commission for an increase of 5% in freight rates, and the Commission now has this application under consideration.

In the operation of the pension department 32 employees were retired and placed upon the pension rolls. Of these retirements, 27 were authorized because of the attainment of seventy years of age and 5 because of total and permanent disability. Twenty-six pensioners died during 1913 and at the close of the year 203 retired employees were carried upon the pension rolls. The average monthly pension allowance to these men was \$21.19, and the total amount paid in pension allowances during the year was \$49,956.42.

Mr. J. Pierpont Morgan, who had been a director of this company since June 7, 1889, died at Rome, Italy, on March 31, 1913, and was succeeded as a director by his son, Mr. J. Pierpont Morgan on May 28, 1913.

On April 1, Mr. Alfred H. Smith was appointed Senior Vice President of this company, and at the Stockholders' meeting of October 29, he was elected a director. On December 17, Mr. Smith was elected President of this company, to succeed Mr. William C. Brown, who resigned on November 18, effective December 31, 1913.

On April 1, Mr. John J. Bernet was appointed a vice president of this company in charge of operation, maintenance and construction.

Other appointments during the year were as follows:

On February 10, William Garstang, General Master Car Builder.
On February 10, Simeon K. Dickerson, Superintendent of Motive Power.
On July 10, John Q. Van Winkle, Assistant to Vice President.
On July 10, Harry A. Worcester, General Manager.
On July 14, Walter R. Gibbons, Real Estate Agent.
On September 1, Ira S. Downing, Master Car Builder.
On December 1, Charles A. Paquette, Chief Engineer of Maintenance of Way.

On the pages following will be found the general balance sheets and tabulated statements showing results of operation for the year.

Acknowledgment is hereby rendered to officers and employees for faithful and efficient service.

ALFRED H. SMITH,
Senior Vice President.

THE MICHIGAN CENTRAL RAILROAD COMPANY—ANNUAL REPORT

To the Stockholders of

THE MICHIGAN CENTRAL RAILROAD COMPANY:

The Board of Directors herewith submits its report for the year ended December 31, 1913, with statements showing the results for the year and the financial condition of the company.

The report covers the operation of mileage, as follows:

	Miles
Main line	270.07
Proprietary lines	326.29
Leased lines	1,110.20
Lines operated under trackage rights.....	93.18

Total road operated (as shown in detail on another page) . 1,799.74

Of the total road operated, 72.82 miles are operated in freight service only and 26.44 miles in passenger service only.

This company and The Lake Shore & Michigan Southern Railway Company are joint owners of the Detroit Toledo & Milwaukee Railroad, which, for convenience of operation, has been divided between the owners. The sale during the year of 39.17 miles of this line between Battle Creek and Allegan to the Michigan & Chicago Railway Company, the construction of a spur at Battle Creek and a re-division of the remaining road between the owners has resulted in a loss to The Michigan Central Railroad Company of 19.41 miles of proprietary line operated. The construction of a Detroit Delray & Dearborn Railroad connection with the Michigan Central Railroad main line at Junction Yards has added 2.39 miles, with a resulting net loss of 17.02 miles of proprietary line operated as compared with 1912.

There was no change in capital stock during the year, the amount authorized and outstanding being \$18,738,000.00.

The funded debt outstanding December 31, 1912, was..... \$43,316,174.34

It has been increased during the year by pro-rata liability for certificates under the New York Central Lines Equipment Trust agreement of 1913..... 2,055,234.09

\$45,371,408.43

It has been decreased during the year as follows:

Payment of pro-rata of installments on account of New York

Central Lines equipment trust certificates

November 1, 1913 trust of 1907.. \$260,425.45

January 1, 1913 trust of 1910.. 368,019.72

January 1, 1913 trust of 1912.. 151,710.90 \$780,156.07

Michigan Central-Jackson Lansing & Saginaw three and one-half per cent gold bonds of 1951 purchased and canceled by the Trustees of the Land Grant Fund of the Jackson Lansing & Saginaw Railroad Company

4,000.00 784,156.07

Total funded debt December 31, 1913 (detail on another page)

\$44,587,252.36

The changes in the road and equipment account during the year were as follows:

Amount charged against main line to December 31, 1912.... \$50,555,505.20

Charged for additions and betterments in 1913, as shown in detail on another page

Against capital account

For road

For equipment

\$1,852,052.18 \$3,864,371.86

Less:

Equipment replacement fund \$330,241.44

Accrued reserve for depreciation

700,451.18 1,030,692.62 2,833,679.24

Total main line..... \$53,389,184.44

Amount charged against leased lines to December 31, 1912

\$16,618,610.44

Charged for additions and betterments in 1913, as shown in detail on another page

Against capital account

For road

Less: Jackson Lansing and

Saginaw R R bonds retired

4,000.00 1,180,505.12

Total leased lines

17,799,115.56

Total December 31, 1913.....

\$71,188,300.00

The sale of the last of three Detroit River ferry boats, belonging to The Canada Southern Railway Company, to the Kelly Island Line & Transport Company, for a consideration of \$25,000.00 was consummated March 5, 1913, and the proceeds paid over to The Canada Southern Railway Company.

On January 28, 1913, by the purchase of four-tenths (4/10ths) share, from The Canada Southern Railway Company, this company increased its holdings of the capital stock of The Toronto Hamilton & Buffalo Railway Company to six thousand two hundred fifty (6,250) shares.

On March 1, 1913, this company issued its one year promissory notes for \$4,000,000.00, bearing interest at rate of 4½% per annum, and retired its one year 4% notes of an equal amount which matured on that date.

On December 30, 1912, this company advanced to the Bay City & Battle Creek Railway Company, on its promissory note, without interest, \$50,000.00 with which to purchase a portion of the right-of-way of the Hecla Belt Railroad, from a point of connection with the line of the Bay City & Battle Creek Railway Company near Bay City, Michigan. The property thus acquired will afford a more convenient and economical interchange with the Detroit & Mackinac Railway, and access to new industries.

During the year a portion of the line of the Detroit Delray & Dearborn Railroad was double tracked, and a double track connection therefrom to the main line of the Michigan Central Railroad near Junction Yards, West Detroit, was constructed at an expense of \$110,500.00.

The necessary approval has been obtained from the proper state authorities of an increase in the capital stock of The Detroit Delray & Dearborn Railroad Company from \$50,000.00 to \$500,000.00 (the latter amount being erroneously stated in the report for the year ended December 31, 1912, as \$375,000.00).

During the year the Detroit Terminal Railroad, in which this company has a one-fourth interest, was extended 3.89 miles to a connection with this company's main line, near Junction Yards, West Detroit, at a cost of approximately \$84,000.00 and this company advanced its ownership proportion (25%) of such cost.

Out of \$24,000,000.00 of certificates authorized under the New York Central Lines equipment trust of 1913, there were issued during the year an aggregate of \$15,494,000.00. The cost of the equipment to be assigned to this company in connection with the issue of these latter certificates is approximately \$2,283,593.43, and its pro-rata amount of certificates, representing not to exceed ninety (90) per cent of the cost, is \$2,055,234.09. Full particulars as to the character of the equipment acquired are set forth upon another page of this report.

Losses were sustained by the company during the year through fires which destroyed valuable property, including one grain elevator at Kensington, Illinois, a car repair shop at West Detroit, a considerable portion of the stock yards at the same point, and the passenger station and general offices at Detroit. The losses not covered by insurance were, to a very great extent, covered by the balance in the reserve fund accumulated in prior years to meet such contingencies. The elevator, car repair shop and stock yards have been restored, or are under construction.

The disastrous fire, which put the passenger station and general offices of this company in Detroit out of use, occurred December 26, 1913, at about half past two in the afternoon. Fortunately, the new station and general office building in this city, under construction by the Detroit River Tunnel Company, and leased to The Michigan Central Railroad Company

was sufficiently near completion for immediate occupation. Train service was at once transferred to the new station, and the general offices were moved and put into service within twenty-four hours. Great credit is due the General Manager and his assistants for their efficient work. No important records were destroyed.

The new station, office building and train shed have been constructed along the most modern designs with every necessary facility, and will be adequate for the use of this company for many years to come. Ample provision has been made for the storage of baggage, mail and express, and in addition there are cleaning yards and a service building for the car department, dining car department, and Pullman Company. During the short time the station has been in operation it has proved an unqualified success.

SUMMARY OF FINANCIAL OPERATIONS AFFECTING INCOME

	1913	1912	Increase or Decrease
RAILWAY OPERATING INCOME			
RAIL OPERATIONS	1,799.74	1,816.76	-17.02 miles
Revenues	\$36,011,885.97	\$32,911,753.07	\$3,100,132.90
Expenses	27,313,272.92	23,008,755.63	4,304,517.29
NET REVENUE RAIL OPERATIONS	\$8,698,613.05	\$9,902,997.44	-\$1,204,384.39
Percentage of expenses to revenues	(75.85%)	(69.91%)	(5.94%)
AUXILIARY OPERATIONS			
Revenues	\$665,084.61	\$663,850.55	\$1,234.06
Expenses	680,503.26	635,752.02	44,751.24
NET DEFICIT AUXILIARY OPERATIONS	\$15,418.65	\$28,098.53*	-\$43,517.18
NET RAILWAY OPERATING REVENUE	\$8,683,194.40	\$9,931,095.97	-\$1,247,901.57
RAILWAY TAX ACCRUALS	1,392,813.51	1,366,984.90	25,828.61
RAILWAY OPERATING INCOME	\$7,290,380.89	\$8,564,111.07	-\$1,273,730.18
OTHER INCOME			
Joint facility rent income	\$255,584.14	\$207,114.02	\$48,470.12
Miscellaneous rent income	1,725.94	2,093.84	-367.90
Dividend income	746,941.50	618,556.67	128,384.83
Income from funded securities	46,880.00	46,880.00	.....
Income from unfunded securities and accounts	192,198.54	186,018.65	6,179.89
Miscellaneous income	2,726.72	.....	2,726.72
TOTAL OTHER INCOME	\$1,246,056.84	\$1,060,663.18	\$185,393.66
GROSS INCOME	\$8,536,437.73	\$9,624,774.25	-\$1,088,336.52
DEDUCTIONS FROM GROSS INCOME			
Deductions for lease of other roads	\$3,662,313.88	\$3,545,579.46†	\$116,734.42
Hire of equipment—debit balance	1,376,527.09	1,099,646.52	276,880.57
Joint facility rent deductions	579,350.32	560,795.72	18,554.60
Miscellaneous rent deductions	8,574.08	3,013.41	5,560.67
Miscellaneous tax accruals	20,652.97	11,286.84	9,366.13
Separately operated properties—loss	52,246.83	245,802.66	-193,555.83
Interest deductions for funded debt	1,258,304.38	1,239,327.82†	18,976.56
Interest deductions for unfunded debt	294,195.68	192,988.94	101,206.74
Miscellaneous deductions	1,112.00	.....	1,112.00
TOTAL DEDUCTIONS	\$7,253,277.23	\$6,898,441.37	\$354,835.86
NET INCOME	\$1,283,160.50	\$2,726,332.88	-\$1,443,172.38
DIVIDENDS, TWO, AGGREGATING 6%	1,124,280.00	1,124,280.00	.....
SURPLUS	\$158,880.50	\$1,602,052.88	-\$1,443,172.38

* Revenue.

† Revised for comparison.

AMOUNT TO CREDIT OF PROFIT AND LOSS (FREE SURPLUS) DECEMBER 31, 1912	\$13,228,542.28
ADD	
Surplus for the year 1913	\$158,880.50
Profit from sale of a part of the Detroit Toledo and Milwaukee Railroad	132,501.00
Premium (less commission and expense) on sale of one year six per cent notes	2,020.30
	293,401.80
	\$13,521,944.08
DEDUCT	
Discount, commission and expenses equipment trust certificates of 1913, and one year four and one-half per cent notes	\$126,058.41
Additional excise tax for years 1909, 1910 and 1911	33,177.37
For abandoned property	153,611.11
Sundry adjustments and cancellations (net)	53,098.31
	365,945.20
BALANCE TO CREDIT OF PROFIT AND LOSS (FREE SURPLUS) DECEMBER 31, 1913	\$13,155,998.88

For the year covered by this report the revenue from transportation was \$35,644,055.00, an increase of \$3,063,201.94 as compared with the previous year; revenue from operations other than transportation was \$367,830.97, an increase of \$36,930.96, and revenue from auxiliary operations (connected with but in addition to transportation by rail) was \$665,084.61, an increase of \$1,234.06. The total gross revenue from all operations \$36,676,970.58 was the largest in the history of the company and an increase compared with 1912 of \$3,101,366.96.

The freight revenue was \$23,131,935.92, an increase of \$1,813,731.42. This was due to the increased movement of nearly all commodities.

The passenger revenue was \$9,305,636.24, an increase of \$1,055,300.14. This additional revenue was largely contributed by interline business, both home and foreign, and immigrant travel; also by local business, the increase

in which was caused to a considerable extent, by the policy of discontinuing low-rate excursion travel, with a resulting greater average distance carried and average amount received per passenger.

The express revenue was \$1,716,303.88, an increase of \$105,910.06 compared with the previous year, due to an enlarged volume of business, producing an increase in the first eight months of \$157,056.38, partly offset by a decrease in the remaining months, due principally to the operation of the parcel post.

The revenue from transportation of mails was \$444,726.95, an increase of \$10,396.21, due principally to increased compensation, effective July 1, 1913, allowed by the United States Government for carrying parcel post matter.

Since the regular quadrennial weighing of mails in 1911, the parcel post has been inaugurated, the original weight limit of parcels being eleven pounds, for the transportation of which Congress has allowed an increase in compensation (effective from July 1, 1913, and until the next regular weighing of the mails) of not to exceed five per cent, which is equal to an annual increase of \$17,148.00 in the compensation paid this company for carrying the mails.

The situation in reference to mail pay, however, is still unsatisfactory. Pending the report of the joint Congressional Committee now sitting and action upon this report by Congress, the conditions have been much aggravated by the enlargement of the parcel post, with substantially no return to the railroads for the increased service. This new feature of mail transportation has had the effect of curtailing express revenue without compensating return from other sources of traffic.

The operating revenue from all other sources increased \$114,795.07 over the previous year; the principal items being other passenger train revenue \$14,057.69, switching \$47,424.42, car service \$11,404.56, and rents of buildings and other property \$22,084.95.

The total expenses of rail operations were \$27,313,272.92, an increase of \$4,304,517.29, as per detail on following pages. By groups the increases were as follows:

Maintenance of way and structures	\$1,219,119.62
Maintenance of equipment	1,303,070.99
Traffic expenses	35,926.60
Transportation expenses	1,699,479.35
General expenses	46,920.73
Total	\$4,304,517.29

The increase in maintenance of way and structures was principally caused by heavy expenditures in connection with the maintenance and upkeep of the roadway. The increased force necessary for this work was employed at higher rate of wages. There was a greater number of ties laid and at an increased cost per tie, and a larger expenditure for rock ballast, rails and other track material.

The replacement of Grand River bridge, of buildings destroyed by fire at West Detroit stock yards, and of telegraph lines destroyed by storms, explains the increases in accounts affected thereby.

These increases were offset to some extent by reduction in the accounts "Removal of snow, sand and ice," due to the open winter; and in "Signals and interlocking plants" and "Buildings, fixtures and grounds," due to large expenditures in the previous year for replacement of signals on the west division, and of the West Detroit roundhouse.

The increase in maintenance of equipment was due principally to large expenditures for repairs and renewals, a heavy outlay having been found necessary for repairs to freight cars in outside shops, due to inability to properly care for these repairs with the company's present facilities.

The increase in traffic expenses is due to increased expenditures account of fast freight lines, cost of advertising, cost of printing tariffs in connection with application for increase in freight rates, and to maintenance of outside agencies; partially offset by decreased cost of supervision and in other expenses.

The increase in transportation expenses is principally due to increased mileage and tonnage, higher rates of wages paid employees in station, train, yard and signal service, and unusually large payments on account of loss and damage—freight.

The increase of \$46,920.73 in general expenses covers additional insurance, new and additional requirements of State and Interstate Commerce Commissions, a more thorough revision of way bills in the general office, and the investigating and handling of many more overcharge and loss and damage claims caused by a greater volume of business.

The expenses of conducting auxiliary operations amounted to \$680,503.26, an increase of \$44,751.24; of which \$37,124.93 was attributable to the dining car service, principally due to depreciation and additional cars operated; \$2,371.77 to grain elevators, and \$6,936.23 to restaurants, partly offset by a decrease of \$1,681.69 on account of stock yards.

The result of auxiliary operations was a net deficit of \$15,418.65, a decrease in net revenue over previous year of \$43,517.18 principally due to decrease of \$20,676.55 in dining car service, \$20,964.94 from stock yards, and \$1,475.07 from restaurants.

The operating income was \$7,290,380.89, a decrease of \$1,273,730.18.

Other income was \$1,246,056.84, an increase of \$185,393.66 as compared with the previous year, due principally to increase in joint facility rent, dividend income, and interest on unfunded securities and accounts.

The gross income was \$8,536,437.73, a decrease of \$1,088,336.52.

Deductions from gross income amounted to \$7,253,277.23, an increase of \$354,835.86. The principal fluctuations were increases of \$133,449.00 in rental of Detroit River Tunnel, \$276,880.57 in hire of equipment, \$101,206.74 in interest on unfunded debt, \$24,115.27 in rents payable, \$18,976.56 in interest on funded debt due to equipment trust certificates and \$9,366.13 in miscellaneous taxes; partially offset by \$16,572.63 reduction in interest due to refunding Canada Southern bonds and \$193,555.83 in separately operated properties—loss, the latter due almost entirely to discontinuance by this company of participation in the operating deficits of the Merchants Despatch Transportation Company.

The profit from operation for the year, after payment of six per cent in dividends upon the capital stock, was \$158,880.50 which has been carried to the credit of profit and loss.

The credits for retired equipment during the year amounted to \$559,475.00. The charges against this account for proportion of cost of four coaches, and one combination baggage, mail and express car for Toronto Hamilton & Buffalo Line, one hundred and forty-five new freight cars, one switch engine, one scale testing car, superheaters, betterments, etc., aggregated..... 229,233.56

Credit balance equipment replacement fund December 31, 1912.. 330,241.44
341,236.67

Total credit balance December 31, 1913..... 671,478.11

During the year expenditures in excess of \$3,300,000.00 were made on

extensive improvements of facilities, as shown in detail on another page, the cost of the more important items, partly estimated, being as follows:

At Junction Yards, Detroit, a modern double hump gravity switching yard, with 66 miles of track has been completed at a cost of \$1,140,000.00.

A new ice house at West Detroit, with capacity of 40,000 tons is now under construction at an estimated cost of \$110,000.00.

Grade separation at Detroit, on the Bay City division, in pursuance of agreement with the City of Detroit, \$90,000.00.

Land at a cost of \$155,000.00 has been purchased at Junction Yards, anticipating the reconstruction and removal of the transfer house from its present location.

Improvements in Detroit's outlying freight houses have been made to the extent of \$57,000.00, and paving of team tracks adjacent thereto to the extent of \$85,000.00, in order to properly care for increase in business at these stations.

The extension of Jackson Junction yards has been accomplished at a cost of \$50,000.00, and at the same place \$190,000.00 has been expended in extending the erecting shop and building a blacksmith shop.

An expenditure of \$110,000.00 for a grain elevator at Kensington to replace the old one at this point destroyed by fire. This represents about 40% of the total cost of building now under construction.

At North Toledo \$85,000.00 has been expended in the construction of a roundhouse, repair tracks, etc.

To prevent delays and to facilitate the handling of trains, the line between North Toledo yards and West Toledo has been double tracked, and an extension made to the yards at an expense of \$115,000.00.

Under arrangement, dated November 1, 1913, made with the Manistee & North Eastern Railroad Company, a spur track has been built at an expense of \$50,000.00, by which this company will be able to reach the new camp site of the Michigan National Guard, situated about 6.31 miles from Grayling.

At St. Thomas a new erecting shop and power plant has been provided, at a cost of \$300,000.00.

During the year 1913, practically all of the railroads in the eastern section of the United States, operating in the territory east of the Mississippi and north of the Ohio and Potomac Rivers, were parties to arbitrations, first with the Brotherhood of Locomotive Firemen and Enginemen, and later with the Order of Railway Conductors and Brotherhood of Railroad Trainmen, acting jointly.

The concerted movement of the firemen demanded standardization of pay and working conditions, involving an increase in the wages of firemen employed by this company of approximately 52%, and resulted in arbitration under the Erdman Act. The railroads selected Mr. William W. Atterbury, Vice-President of the Pennsylvania Railroad, and the firemen designated Mr. Albert Phillips, Vice-President of the Brotherhood of Locomotive Firemen and Enginemen. The third member of the Board (appointed by the Federal Authorities) was the Honorable William L. Chambers, of Washington, D. C., who was selected chairman.

The arbitration proceedings were held in New York from March 10th to April 5th, and on April 23rd an award was handed down which provided for an increase in the wages paid to firemen on the Michigan Central Railroad of 10%, or approximately \$87,500.00 per annum.

While the conference committee of managers were engaged in preparation for the firemen's arbitration proceedings, a petition approved October 19th, 1912, by the eastern association of general committees, Order of Railway Conductors and Brotherhood of Railroad Trainmen for standardization of rates of pay, involving an increase in the payrolls of this company, estimated at \$493,000.00 per annum, was presented to all roads east of Chicago and north of the Chesapeake & Ohio Railway, and to the conference committee of managers as well, with a view of ascertaining whether the matter would be handled by the several roads individually or in concert. United action was determined upon by the roads concerned and an arbitration board consisting of six members was agreed to under the terms of the Newlands amendment of the Erdman Act.

The railroads were represented upon this board by Mr. W. W. Atterbury, Vice-President, Pennsylvania Railroad, and Mr. A. H. Smith, Senior Vice-President, New York Central Lines.

The conductors' and trainmen's organizations designated as their representatives Mr. L. E. Sheppard, Senior Vice-President, Order of Railway Conductors, and Mr. D. L. Cease, editor and manager, "The Railroad Trainmen," and the four members so selected met and completed their board by choosing the Honorable Seth Low and Doctor John H. Finley, President, the College of the City of New York.

The Board so constituted, having chosen Mr. Seth Low as its chairman, heard testimony between September 11th and October 15th, and on November 10th handed down its award, which provided for an increase in the wages of conductors and trainmen employed by this company of 6.8% or approximately \$167,000.00 per annum.

Section 19-A of the Act to Regulate Commerce, which became a law on the first day of March, 1913, provides that the Interstate Commerce Commission shall investigate and ascertain the value of all the property owned or used by all railroad companies. The commission is required to ascertain and report in detail as to each piece of property owned or used, the original cost to date, cost of reproduction new, cost of reproduction less depreciation; also all other values and elements of value, if any, of

such property. It is also required to investigate and to report upon the history and organization of the present and of any previous corporation operating the property; upon moneys received by reason of any issues of stocks, bonds, or other securities; upon the syndicating, banking and other financial arrangements under which such issues were made and the expense thereof, together with a large number of other matters unnecessary to specify in detail. The company is required to co-operate with and aid in the work of the valuation of its property in such particulars and to such extent as the commission may require and direct. It is impossible even to approximate at this time the expense which will thereby be incurred.

The performance of the work for the company has been undertaken by a Valuation Committee appointed by the Board of Directors. The committee is engaged in the preliminary inquiries essential to the proper organization of the necessary forces and in making the preparation required to comply with the requirements of the commission.

Shortly after the passage of the act, the principal carriers of the country including this company, organized an association known as the Presidents' Conference Committee. This committee in an informal conference with the commission, pledged its hearty co-operation in the work. It has appointed an engineering committee consisting of fifteen members, which for several months past has been engaged in discussing with the board of engineers appointed by the commission, the maps, profiles and schedules which shall be furnished by the carriers to the commission for its use in inspecting, listing and valuing the property of the carriers. The questions involved have been of great importance and difficulty and as a result these conferences have necessarily taken a very considerable time, and no active work has been undertaken by the commission upon the property of this company. It is expected, however, that progress will be made during the year 1914.

In May, 1913, The Michigan Central Railroad Company joined with other roads in the official classification territory in an application to the Interstate Commerce Commission for an increase of 5% in freight rates, and the commission now has this application under consideration.

In the operation of the pension department 41 employees were retired and placed upon the pension rolls. Of these retirements, 30 were authorized because of the attainment of seventy years of age and 11 because of total and permanent physical disability. During the year 30 pensioners died and at the close of the year 204 retired employees were carried upon the pension rolls. The average monthly pension allowance to these employees was \$22.18 and the total amount paid them in pension allowances was \$57,152.60.

Mr. J. Pierpont Morgan, who had been a director of this company since May, 1903, died at Rome, Italy, on March 31, 1913, and was succeeded as a director by his son Mr. J. Pierpont Morgan on May 8, 1913.

The death during the year of two valued and esteemed officers of the company is recorded.

Mr. David S. Sutherland, General Agent, died December 17, 1913.

Mr. Sutherland began service as a messenger boy in the car department of this company February 1, 1864, at the age of fifteen years, and continued in the employment of the company until the day of his death, a period of only one month and a half less than fifty years. At the age of sixteen he became a car checker, and was yardmaster, trainmaster, division superintendent and general agent, rendering his entire active lifework in the useful and loyal service of the company. His familiarity with the railroad from its early beginnings, and his force and executive ability, made of him an officer in whom great trust and reliance was reposed. His influence with his men and his strong Christian character, were exceptional; his excellent career reflected credit upon himself and the company.

Mr. Nathaniel E. Slaymaker, Attorney for the company, and Land Commissioner of the Jackson Lansing & Saginaw Railroad Company, died at Detroit, Michigan, July 23, 1913, after serving the company faithfully and efficiently for fourteen years.

At a meeting of the Board of Directors, held November 18, 1913, Mr. W. C. Brown, President, presented his resignation, effective December 31, 1913.

On April 1, 1913, Mr. Alfred H. Smith was appointed Senior Vice-President, and Mr. John J. Bernet a vice president of the company.

At the meeting of the Board of Directors, held December 17, 1913, Mr. Alfred H. Smith was elected President, effective January 1, 1914, succeeding Mr. W. C. Brown.

During the year the following additional appointments of officials were made:

Jan. 8, 1913	Walter E. Hackett, Local Treasurer.
Jan. 16, 1913	Henry Shearer, Assistant General Superintendent.
Aug. 1, 1913	William Hutchinson, Land Commissioner, J L & S RR Co.
Sept. 1, 1913	John M. Simpson, Assistant General Passenger Agent.
Nov. 12, 1913	Harry J. Perkins, Industrial Agent.
Dec. 1, 1913	James F. Deimling, Assistant Chief Engineer.
Dec. 1, 1913	Frank B. Marble, Division Engineer.
Dec. 1, 1913	Charles C. Hill, Engineer of Construction.

Acknowledgment is hereby rendered to officers and employees for faithful and efficient service.

ALFRED H. SMITH,
Senior Vice-President.